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July 1, 2014

ATTN: Document Control Desk
Brian Holian, Director
Office of Federal and State Materials and Environmental Management Programs
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Re: Supplemental Air Particulate, Radon and Direct Radiation Data for the Dewey-Burdock Project, SUA-1600, License Condition 9.2 (ML14043A392).

Dear Director Holian:

Supplemental air particulate, radon and direct radiation data are provided in the enclosed report to satisfy commitments made in Sections 1.0 and 6.0 of Attachment A of Powertech (USA) Inc.'s October 19, 2012 Supplemental Sampling Plan and Responses to Comments Regarding Draft License SUA-1600 (ML12305A056). It is being delivered by FedEx along with an ADAMS-compliant copy on CD.

Please do not hesitate to contact me with questions at (303) 790-7528.

Sincerely,

A handwritten signature in black ink, appearing to read "Richard Blubaugh", is written over a light blue horizontal line.

Richard Blubaugh
Vice President – Environmental, Health and Safety Resources

Enclosure: Supplemental Air Particulate, Radon and Direct Radiation Data

Mr. Brian Holian
NRC - Office of Federal and State Materials
and Environmental Management Programs
July 1, 2014



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**SUPPLEMENTAL AIR PARTICULATE, RADON AND
DIRECT RADIATION DATA
FOR THE DEWEY-BURDOCK PROJECT
CUSTER AND FALL RIVER COUNTIES, SOUTH DAKOTA**

**PREPARED FOR
US NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C.**

**PREPARED BY
POWERTECH (USA) INC.
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1.0 Introduction

Supplemental air particulate, radon and direct radiation data are provided in this document to satisfy commitments made in Sections 1.0 and 6.0 of Attachment A of Powertech (USA) Inc.'s (Powertech's) October 19, 2012 Supplemental Sampling Plan and Responses to Comments Regarding Draft License SUA-1600 (ML12305A056). Commitments of the supplemental sampling plan are incorporated into Powertech's final license as condition number 9.2 (ML14043A392) and are referenced in Sections 2.6.3.1, 5.7.8.3.1 and 5.7.8.3.2.1 of the US Nuclear Regulatory Commission's (NRC) Safety Evaluation Report (Revised) (ML14043A347).

2.0 Supplemental Air Particulate Data

Air particulate samples were collected at AMS-08, AMS-09 and AMS-BKG for one year between January 4, 2013 and January 3, 2014 to satisfy preoperational sampling guidance in NRC Regulatory Guide (RG) 4.14 Section 1.1.1. Weekly filter changes were composited quarterly and analyzed for natural uranium, thorium-230, radium-226, and lead-210.

In addition, air particulate samples were collected at AMS-01, AMS-02, AMS-03, and AMS-04 during two periods and analyzed for uranium to meet NRC RG 4.14 Section 5 lower limits of detection (LLDs). Weekly filter changes were composited during each period.

Collectively, AMS-01, AMS-02, AMS-03, AMS-04, AMS-08, AMS-09, and AMS-BKG comprise the Dewey-Burdock operational air monitoring network. Monitoring station locations are shown on Figure 1 of the supplemental sampling plan (ML12305A056).

All samplers are Hi-Q Model HVP-4200AFC high-volume air samplers except the sampler at AMS-09, which is a solar-powered Hi-Q Model CF-5624-WR low-volume air sampler. Both models are manufactured by Hi-Q Environmental Products Company in San Diego, California. Procedures for operating and maintaining high-volume samplers are provided in Appendix 2.9-B of the February 28, 2009 Dewey-Burdock Technical Report (ML091200014) and procedures for operating and maintaining the low-volume air sampler at AMS-09 are provided in Appendix A of this document.

High-volume air samplers were calibrated prior to the 2013-2014 monitoring program using a Hi-Q single range HFC series 50C air flow calibrator with a Hi-Q FHA-810CF adapter plate and the procedures described in the operations and maintenance manual. The air flow calibrator was calibrated by the factory prior to use. The solar-powered air sampler arrived new at the site from the manufacturer with a calibration certificate and instructions that it did not require calibration. Calibration records for the air samplers and the HFC 50C are provided in Appendix B. Annual recalibration is recommended by the manufacturer for both sampler models, but since monitoring was discontinued after a year, recalibration was not necessary.

8-inch by 10-inch, 0.8-micron EPM 2000 glass microfiber filter paper manufactured by Whatman International Limited in Banbury, England was used with high-volume samplers and a 4-inch diameter, 1.0-micron glass microfiber filter paper manufactured by Pall Corporation in Ann Arbor, Michigan was used with the low-volume air sampler.

Samplers were operated continuously except for short periods of down time due to filter change outs and power disruptions. In addition, the solar-powered air sampler at AMS-09 experienced down time between December 5, 2013 and December 20, 2013 while it was being repaired and recalibrated at the manufacturer's facility in San Diego. The tubing from the inlet to the flow sensor inside the sampler housing had loosened causing a low airflow reading. The recalibration record is provided in Appendix B. With downtime included, data recoveries at AMS-01, AMS-02, AMS-03, AMS-04, AMS-08, AMS-09, and AMS-BKG were 95%, 94%, 97%, 99%, 94%, 96%, and 89%, respectively. Taken together, the average was 94%.

Filters were composited for the following air monitoring periods:

AMS-08, AMS-09 and AMS-BKG

2013 Q1: January 4, 2013 – March 28, 2013 (IML Report S1304119006)
2013 Q2: March 28, 2013 – June 28, 2013 (IML Report S1309062004)
2013 Q3: June 28, 2013 – October 2, 2013 (IML Report S1310169003)
2013 Q4: October 2, 2013 – January 3, 2014 (IML Report S1401353004)

AMS-01, AMS-02, AMS-03, and AMS-04

2013 P1: August 9, 2013 – October 2, 2013 (IML Report S1310169003)
2013 P2: October 2, 2013 – January 3, 2014 (IML Report S1401353004)

Inter-Mountain Labs (IML) of Sheridan, Wyoming composited, digested and analyzed filters using methods shown in Table 1. Methods used were compatible with those used by Energy Laboratories, Inc. (ELI) in Casper, Wyoming to analyze the 2007-2008 air particulate samples.

Table 1. Comparison of Inter-Mountain Labs and Energy Laboratories, Inc. Analytical Methods for Air Particulate Samples

Parameter	Inter-Mountain Labs 2013-2014 Particulate Samples	Energy Laboratories, Inc. 2007-2008 Particulate Samples	Discussion
Uranium	E200.8	SW6020	Equivalent method and results.
Thorium-230	ACW10	E907.0	ACW10 uses a resin to purify and concentrate thorium-230, which is then electroplated on a disk and analyzed by Alpha Spectrometry. E907.0 uses solvent exchange to purify and concentrate thorium-230, which is then fired on a planchette and analyzed by Gas Proportional Counter. Results for the two methods are equivalent.
Radium-226	SM7500RAB	E903.0	Equivalent method and results.
Lead-210	OTW01	E909.0M	OTW01 uses a resin to purify and concentrate lead-210, which is then precipitated, placed on a filter and analyzed by Gas Proportional Counter. E909.0M uses multiple precipitations to purify and concentrate lead-210, which is then placed on a filter and analyzed by Gas Proportional Counter. Results for the two methods are equivalent.

Method references are provided in Appendix D for IML and in the Baseline Radiological Report (ML091040360) for ELI.

Results in picocuries per filter (pCi/filter) were converted by IML to microcuries per milliliter (μCi/mL) using the following formula:

$$\text{Concentration, } \mu\text{Ci} / \text{mL} = \frac{\text{Filter Concentration}}{\text{Total Flow}} (1 \times 10^{-9})$$

Where the filter concentration and total flow are in pCi/filter and liters (L), respectively.

A specific activity of 6.77×10^{-7} curies per gram for uranium from Footnote 3 of 10 CFR 20 Appendix B was used by IML to convert uranium results from mass to activity.

The formula used by IML to calculate total flow was:

$$Total\ Flow, L = \frac{Measured\ Volume\ (Average\ Site\ Temperature + 460)(29.92)}{(77 + 460)(Average\ Site\ Pressure)}$$

Where the measured volume, site temperature and site pressure are in liters, °F and inches mercury, respectively.

Measured volumes in standard cubic feet were recorded from each flow totalizer during weekly filter changes and converted to liters by IML. Average site temperatures and pressures retrieved from the Dewey-Burdock meteorological weather station are summarized in Table 2 and presented with other meteorological data in Appendix C.

Table 2. Average Site Temperatures and Pressures

Period	Average Temperature	Average Barometric Pressure
Q1 - 2013	-3.1°C (26.4°F)	26.5" Hg
Q2 - 2013	12.0°C (53.6°F)	26.5" Hg
Q3/P1 - 2013	21.6°C (70.9°F)	26.6" Hg
Q4/P2 - 2013	-1.0°C (30.2°F)	26.5" Hg*

* Hourly barometric pressure measurements were in the range of 878 to 897 HPa until November 8, 2013 at 15:00 hours. At that time, the sensor malfunctioned measuring over 1,000 HPa through January 2014. The sensor was replaced June 10, 2014. IML assumed a pressure of 26.6" Hg for the 4th quarter of 2013 based on the 3rd quarter pressure.

The formula used by IML to convert the LLD in pCi/filter to µCi/mL was:

$$LLD, \mu Ci / mL = \frac{Detection\ Limit}{Total\ Flow} (1 \times 10^{-09})$$

Where the detection limit and total flow are in pCi/filter and liters (L), respectively.

Laboratory results are summarized in Tables 3 and 4 and indicate that natural uranium had the lowest overall average concentration at the site followed by radium-226 and thorium-230.

Table 3. Air Particulate Concentrations at Operational Air Monitoring Station Locations

Location	Period	Concentration (μCi/mL)							% of Effluent Concentration (Source: 10 CFR 20 Appendix B Table 2)				Lower Limit of Detection (μCi/mL) (Source: NRC Reg. Guide 4.14 Revised, 1980)			
		U-nat	Th-230	Th-230 2σ Error	Ra-226	Ra-226 2σ Error	Pb-210	Pb-210 2σ Error	U-nat (limit is 3E-12 μCi/mL)	Th-230 (limit is 2E-14 μCi/mL)	Ra-226 (limit is 9E-13E μCi/mL)	Pb-210 (limit is 6E-13 μCi/mL)	U-nat (RG 4.14 LLD is 1E-16)	Th-230 (RG 4.14 LLD is 1E-16)	Ra-226 (RG 4.14 LLD is 1E-16)	Pb-210 (RG 4.14 LLD is 2E-15)
AMS-01	¹ 8/13/2007-10/2/2007	7.1E-15 ^(a)	1.7E-17	2.8E-17	5.3E-17	4.3E-17	2.4E-14	6.2E-16	0.24 ^(a)	0.09	0.01	4.00	7.1E-15 ^(a)	4.2E-18	4.8E-17	2.1E-17
	² 10/02/2007-1/4/2008	0.0E+00 ^(a)	1.6E-18	1.1E-17	7.2E-18	9.1E-18	4.1E-14	6.9E-16	0.00 ^(a)	0.01	0.00	6.83	1.6E-16 ^(a)	1.6E-18	1.6E-18	7.9E-18
	³ 1/4/2008-4/1/2008	-1.3E-17	3.4E-18	1.0E-17	1.8E-17	1.7E-17	2.1E-14	3.5E-16	0.00	0.02	0.00	3.50	1.7E-18	1.7E-18	1.2E-17	2.1E-16
	⁴ 4/1/2008-7/9/2008	2.4E-17	1.3E-17	9.8E-18	1.4E-17	9.7E-18	2.1E-14	4.9E-16	0.00	0.07	0.00	3.50	1.5E-18	1.5E-18	8.3E-18	4.2E-16
	⁵ 7/9/2008-8/13/2008	-1.7E-17	6.5E-18	2.5E-17	-3.1E-17	2.7E-17	1.0E-14	6.5E-16	0.00	0.03	0.00	1.67	4.3E-18	4.3E-18	5.6E-17	6.7E-16
	^{P1} 8/9/2013-10/2/2013	2.9E-18	(b)	(b)	(b)	(b)	(b)	(b)	0.00	(b)	(b)	(b)	7.3E-17	(b)	(b)	(b)
	^{P2} 10/2/2013-1/3/2014	6.6E-18	(b)	(b)	(b)	(b)	(b)	(b)	0.00	(b)	(b)	(b)	4.7E-17	(b)	(b)	(b)
AMS-02	¹ 8/13/2007-10/2/2007	7.0E-15 ^(a)	4.1E-18	2.8E-17	-8.3E-18	2.9E-17	1.1E-14	4.5E-16	0.23 ^(a)	0.02	0.00	1.83	7.0E-15 ^(a)	4.1E-18	3.7E-17	2.1E-17
	² 10/02/2007-1/4/2008	0.0E+00 ^(a)	1.6E-17	1.1E-17	-2.3E-18	7.0E-18	2.0E-14	4.7E-16	0.00 ^(a)	0.08	0.00	3.33	1.5E-16 ^(a)	1.5E-18	1.5E-18	7.6E-18
	³ 1/4/2008-4/1/2008	-2.0E-17	4.7E-18	1.1E-17	-8.6E-18	1.3E-17	8.9E-15	2.5E-16	0.00	0.02	0.00	1.48	1.6E-18	1.6E-18	1.1E-17	1.9E-16
	⁴ 4/1/2008-7/9/2008	4.2E-18	0.0E+00	7.4E-18	-4.2E-18	7.4E-18	8.2E-15	4.2E-16	0.00	0.00	0.00	1.37	1.4E-18	1.4E-18	7.6E-18	3.9E-16
	⁵ 7/9/2008-8/13/2008	-1.3E-17	0.0E+00	8.0E-18	-4.9E-17	2.3E-17	1.5E-14	6.5E-16	0.00	0.00	-0.01	2.50	4.0E-18	4.0E-18	5.3E-17	6.2E-16
	^{P1} 8/9/2013-10/2/2013	1.5E-17	(b)	(b)	(b)	(b)	(b)	(b)	0.00	(b)	(b)	(b)	6.9E-17	(b)	(b)	(b)
	^{P2} 10/2/2013-1/3/2014	1.0E-17	(b)	(b)	(b)	(b)	(b)	(b)	0.00	(b)	(b)	(b)	4.5E-17	(b)	(b)	(b)

Table 3. Air Particulate Concentrations at Operational Air Monitoring Station Locations (continued)

Location	Period	Concentration (μCi/mL)							% of Effluent Concentration (Source: 10 CFR 20 Appendix B Table 2)				Lower Limit of Detection (μCi/mL) (Source: NRC Reg. Guide 4.14 Revised, 1980)			
		U-nat	Th-230	Th-230 2σ Error	Ra-226	Ra-226 2σ Error	Pb-210	Pb-210 2σ Error	U-nat (limit is 3E-12 μCi/mL)	Th-230 (limit is 2E-14 μCi/mL)	Ra-226 (limit is 9E-13E μCi/mL)	Pb-210 (limit is 6E-13 μCi/mL)	U-nat (RG 4.14 LLD is 1E-16)	Th-230 (RG 4.14 LLD is 1E-16)	Ra-226 (RG 4.14 LLD is 1E-16)	Pb-210 (RG 4.14 LLD is 2E-15)
AMS-03	¹ 8/13/2007-10/2/2007	5.0E-15 ^(a)	-1.5E-18	2.0E-17	-5.9E-18	2.1E-17	1.2E-14	3.7E-16	0.17 ^(a)	-0.01	0.00	2.00	5.0E-15 ^(a)	3.0E-18	2.7E-17	1.5E-17
	² 10/02/2007-1/4/2008	0.0E+00 ^(a)	9.3E-18	1.0E-17	5.4E-18	8.9E-18	1.3E-14	3.9E-16	0.00 ^(a)	0.05	0.00	2.17	1.6E-16 ^(a)	1.6E-18	1.6E-18	7.8E-18
	³ 1/4/2008-4/1/2008	-3.0E-17	9.3E-18	1.2E-17	-1.4E-17	1.3E-17	9.2E-15	2.5E-16	0.00	0.05	0.00	1.53	1.5E-18	1.5E-18	1.2E-17	1.9E-16
	⁴ 4/1/2008-7/9/2008	1.8E-17	8.9E-18	9.0E-18	9.6E-18	9.5E-18	8.0E-15	4.4E-16	0.00	0.04	0.00	1.33	1.5E-18	1.5E-18	8.9E-18	4.1E-16
	⁵ 7/9/2008-8/13/2008	-1.6E-17	1.9E-17	9.7E-18	-3.2E-18	3.1E-17	1.2E-14	6.5E-16	0.00	0.10	0.00	2.00	4.2E-18	4.2E-18	5.0E-17	6.6E-16
	^{P1} 8/9/2013-10/2/2013	2.6E-17	(b)	(b)	(b)	(b)	(b)	(b)	0.00	(b)	(b)	(b)	7.3E-17	(b)	(b)	(b)
	^{P2} 10/2/2013-1/3/2014	7.5E-18	(b)	(b)	(b)	(b)	(b)	(b)	0.00	(b)	(b)	(b)	4.6E-17	(b)	(b)	(b)
AMS-04	¹ 8/13/2007-10/2/2007	5.0E-15 ^(a)	5.9E-18	2.5E-17	4.6E-17	2.9E-17	1.1E-14	3.7E-16	0.17 ^(a)	0.03	0.01	1.83	5.0E-15 ^(a)	3.0E-18	3.0E-17	1.5E-17
	² 10/02/2007-1/4/2008	0.0E+00 ^(a)	9.4E-18	1.1E-17	2.3E-18	8.3E-18	2.2E-14	5.1E-16	0.00 ^(a)	0.05	0.00	3.67	1.6E-16 ^(a)	1.6E-18	1.6E-18	7.8E-18
	³ 1/4/2008-4/1/2008	-2.6E-17	2.5E-18	1.1E-17	-2.8E-17	1.2E-17	8.5E-15	2.6E-16	0.00	0.01	0.00	1.42	1.7E-18	1.7E-18	9.9E-18	2.0E-16
	⁴ 4/1/2008-7/9/2008	1.9E-17	6.6E-18	9.0E-18	1.2E-17	9.5E-18	1.0E-14	4.6E-16	0.00	0.03	0.00	1.67	1.5E-18	1.5E-18	8.1E-18	4.1E-16
	⁵ 7/9/2008-8/13/2008	-1.0E-18	2.7E-17	9.7E-18	-5.2E-18	3.3E-17	1.3E-14	6.7E-16	0.00	0.14	0.00	2.17	4.2E-18	4.2E-18	5.5E-17	6.6E-16
	^{P1} 8/9/2013-10/2/2013	1.8E-18	(b)	(b)	(b)	(b)	(b)	(b)	0.00	(b)	(b)	(b)	8.2E-17	(b)	(b)	(b)
	^{P2} 10/2/2013-1/3/2014	1.2E-17	(b)	(b)	(b)	(b)	(b)	(b)	0.00	(b)	(b)	(b)	5.1E-17	(b)	(b)	(b)
AMS-08	^{Q1} 1/4/2013-3/28/2013	2.0E-17	1.0E-17	2.0E-17	1.0E-17	1.0E-17	1.9E-14	9.8E-16	0.00	0.05	0.00	3.17	5.1E-17	5.1E-17	5.1E-17	6.8E-16
	^{Q2} 3/28/2013-6/28/2013	1.9E-17	8.2E-18	9.8E-18	1.8E-17	9.8E-18	1.2E-14	6.1E-16	0.00	0.04	0.00	2.00	4.9E-17	4.9E-17	4.9E-17	6.6E-16
	^{Q3} 6/28/2013-10/2/2013	5.2E-19	2.0E-17	1.7E-17	1.3E-17	8.3E-18	1.1E-14	5.8E-16	0.00	0.10	0.00	1.83	4.1E-17	4.1E-17	4.1E-17	5.5E-16
	^{Q4} 10/2/2013-1/3/2014	6.6E-18	1.2E-17	9.3E-18	3.4E-17	9.3E-18	1.6E-14	7.4E-16	0.00	0.06	0.00	2.67	4.6E-17	4.6E-17	4.6E-17	6.2E-16

Table 3. Air Particulate Concentrations at Operational Air Monitoring Station Locations (concluded)

Location	Period	Concentration (µCi/mL)							% of Effluent Concentration (Source: 10 CFR 20 Appendix B Table 2)				Lower Limit of Detection (µCi/mL) (Source: NRC Reg. Guide 4.14 Revised, 1980)			
		U-nat	Th-230	Th-230 2σ Error	Ra-226	Ra-226 2σ Error	Pb-210	Pb-210 2σ Error	U-nat (limit is 3E-12 µCi/mL)	Th-230 (limit is 2E-14 µCi/mL)	Ra-226 (limit is 9E-13E µCi/mL)	Pb-210 (limit is 6E-13 µCi/mL)	U-nat (RG 4.14 LLD is 1E-16)	Th-230 (RG 4.14 LLD is 1E-16)	Ra-226 (RG 4.14 LLD is 1E-16)	Pb-210 (RG 4.14 LLD is 2E-15)
AMS-09	Q1 1/4/2013-3/28/2013	8.7E-17	2.9E-17	2.9E-17	8.7E-17	2.9E-17	4.3E-15	1.0E-15	0.00	0.15	0.01	0.72	2.9E-17	2.9E-17	2.9E-17	2.9E-16
	Q2 3/28/2013-6/28/2013	1.0E-16	3.7E-17	2.5E-17	7.4E-17	2.5E-17	1.9E-15	3.6E-16	0.00	0.19	0.01	0.32	2.5E-17	2.5E-17	2.5E-17	2.5E-16
	Q3 6/28/2013-10/2/2013	5.8E-17	3.4E-17	2.3E-17	5.7E-17	1.1E-17	1.7E-15	3.3E-16	0.00	0.17	0.01	0.28	2.3E-17	2.3E-17	2.3E-17	2.3E-16
	Q4 10/2/2013-1/3/2014	5.1E-17	3.0E-17	3.1E-17	6.2E-17	1.6E-17	1.0E-14	8.0E-16	0.00	0.15	0.01	1.67	3.1E-17	3.1E-17	3.1E-17	3.1E-16
AMS-BKG	1 8/13/2007-10/2/2008	5.7E-15 ^(a)	3.0E-17	2.6E-17	5.0E-18	3.1E-17	1.4E-14	4.2E-16	0.19 ^(a)	0.15	0.00	2.33	5.7E-15 ^(a)	3.3E-18	4.0E-17	1.7E-17
	2 10/02/2007-1/4/2008	0.0E+00 ^(a)	-7.8E-19	9.4E-18	1.2E-17	9.5E-18	2.0E-14	4.8E-16	0.00 ^(a)	0.00	0.00	3.33	1.6E-16 ^(a)	1.6E-18	1.6E-18	7.8E-18
	3 1/4/2008-4/1/2008	1.6E-18	2.0E-17	1.3E-17	-5.6E-18	1.4E-17	8.3E-15	2.5E-16	0.00	0.10	0.00	1.38	1.6E-18	1.6E-18	1.2E-17	2.0E-16
	4 4/1/2008-7/9/2008	1.5E-17	1.4E-18	8.6E-18	2.1E-18	8.0E-18	1.3E-14	4.6E-16	0.00	0.01	0.00	2.17	1.4E-18	1.4E-18	8.5E-18	4.0E-16
	5 7/9/2008-8/13/2008	-8.1E-18	2.4E-17	9.3E-18	-1.7E-17	2.4E-17	1.2E-14	6.3E-16	0.00	0.12	0.00	2.00	4.0E-18	4.0E-18	4.0E-17	6.3E-16
	Q1 1/4/2013-3/28/2013	1.1E-17	2.2E-17	2.2E-17	1.1E-17	1.1E-17	2.1E-14	1.0E-15	0.00	0.11	0.00	3.50	5.4E-17	5.4E-17	5.4E-17	7.2E-16
	Q2 3/28/2013-6/28/2013	1.4E-17	1.1E-17	1.0E-17	4.1E-17	2.0E-17	1.2E-14	6.6E-16	0.00	0.06	0.00	2.00	5.1E-17	5.1E-17	5.1E-17	6.8E-16
	Q3 6/28/2013-10/2/2013	1.4E-18	6.0E-18	9.0E-18	9.7E-18	9.0E-18	1.6E-14	7.0E-16	0.00	0.03	0.00	2.67	4.5E-17	4.5E-17	4.5E-17	6.0E-16
	Q4 10/2/2013-1/3/2014	9.0E-18	2.1E-17	9.6E-18	3.4E-17	9.6E-18	1.7E-14	9.1E-16	0.00	0.11	0.00	2.83	4.8E-17	4.8E-17	4.8E-17	6.4E-16

- (a) The lower limit of detection (LLD) specified in NRC RG 4.14 Section 5 for uranium was not met during periods 1 and 2 of the 2007-2008 sampling program. Uranium results for samples collected in 2013-2014 are used in place of the 2007-2008 results for calculating the summary statistics presented in Table 4.
- (b) Samples were analyzed for uranium only to meet lower limits of detection specified in NRC RG 4.14 Section 5.
- The laboratory reported no blank assay data for the period 7/9/2008 to 8/13/2008. Blank assays in the sample concentration calculation were assumed to be 50 percent of the values for blanks reported for the previous period. The assumption is based on the relative, approximate run-time of the air samplers in both periods. No blank corrections were performed on uranium results for the first monitoring period since sample results were reported as non-detects. In addition, no blank corrections were performed for samples collected during the 2013 - 2014 monitoring periods because no blank filters were analyzed.
 - The percent of effluent concentration for thorium-230 calculated in Table 8.1 of the Baseline Radiological Report (ML091040360 in ML091200014) was inadvertently calculated using an incorrect order of magnitude. This has been corrected in this table. Also, rounding based on significant figures reported for lead-210 was completed in this table, explaining small differences of up to 0.07% between values reported in Table 8.1 of the Baseline Radiological Report (ML091040360) and this table.

Table 4. Summary Statistics for Air Particulate Concentrations at Operational Air Monitoring Station Locations

Location	U-nat Concentration (μCi/mL)				Th-230 Concentration (μCi/mL)				Ra-226 Concentration (μCi/mL)				Pb-210 Concentration (μCi/mL)			
	Average	σ	Min	Max	Average	σ	Min	Max	Average	Σ	Min	Max	Average	σ	Min	Max
AMS-01	7.0E-19	1.6E-17	-1.7E-17	2.4E-17	8.3E-18	6.5E-18	1.6E-18	1.7E-17	1.2E-17	3.0E-17	-3.1E-17	5.3E-17	2.3E-14	1.1E-14	1.0E-14	4.1E-14
AMS-02	-7.6E-19	1.5E-17	-2.0E-17	1.5E-17	5.0E-18	6.6E-18	0.0E+00	1.6E-17	-1.4E-17	1.9E-17	-4.9E-17	-2.3E-18	1.3E-14	4.9E-15	8.2E-15	2.0E-14
AMS-03	1.1E-18	2.3E-17	-3.0E-17	2.6E-17	9.0E-18	7.3E-18	-1.5E-18	1.9E-17	-1.6E-18	9.3E-18	-1.4E-17	9.6E-18	1.1E-14	2.1E-15	8.0E-15	1.3E-14
AMS-04	1.2E-18	1.7E-17	-2.6E-17	1.9E-17	1.0E-17	9.7E-18	2.5E-18	2.7E-17	5.4E-18	2.7E-17	-2.8E-17	4.6E-17	1.3E-14	5.3E-15	8.5E-15	2.2E-14
AMS-08	1.2E-17	9.5E-18	5.2E-19	2.0E-17	1.3E-17	5.2E-18	8.2E-18	2.0E-17	1.9E-17	1.1E-17	1.0E-17	3.4E-17	1.5E-14	3.7E-15	1.1E-14	1.9E-14
AMS-09	7.4E-17	2.3E-17	5.1E-17	1.0E-16	3.3E-17	3.7E-18	2.9E-17	3.7E-17	7.0E-17	1.3E-17	5.7E-17	8.7E-17	4.5E-15	3.9E-15	1.7E-15	1.0E-14
AMS-BKG	6.3E-18	8.3E-18	-8.1E-18	1.5E-17	1.5E-17	1.1E-17	-7.8E-19	3.0E-17	1.0E-17	1.8E-17	-1.7E-17	4.1E-17	1.5E-14	4.1E-15	8.3E-15	2.1E-14
Overall	1.3E-17	5.9E-18	-3.0E-17	1.0E-16	1.3E-17	2.5E-18	-1.5E-18	3.7E-17	1.4E-17	7.9E-18	-4.9E-17	8.7E-17	1.3E-14	2.9E-15	1.7E-15	4.1E-14

Lead-210 had the highest overall average concentration. Natural uranium, radium-226 and thorium-230 concentrations were detected within the same orders of magnitude while average lead-210 concentrations were approximately three orders of magnitude higher. This is typical for the region as described in the discussion regarding U.S. background concentrations in the second to last paragraph on this page. Temporally, there were no clear patterns in radionuclide concentrations.

Site-wide, air particulate data can be summarized as follows:

- Natural uranium concentrations ranged from -3.0×10^{-17} to 1.0×10^{-16} $\mu\text{Ci/mL}$ and averaged 1.3×10^{-17} $\mu\text{Ci/mL}$.
- Thorium-230 concentrations ranged from -1.5×10^{-18} to 3.7×10^{-17} $\mu\text{Ci/mL}$ and averaged 1.3×10^{-17} $\mu\text{Ci/mL}$.
- Radium-226 concentrations ranged from -4.9×10^{-17} to 8.7×10^{-17} $\mu\text{Ci/mL}$ and averaged 1.4×10^{-17} $\mu\text{Ci/mL}$.
- Lead-210 concentrations ranged from 1.7×10^{-15} to 4.1×10^{-14} $\mu\text{Ci/mL}$ and averaged 1.3×10^{-14} $\mu\text{Ci/mL}$.

Observed site values are similar to U.S. background concentrations reported in the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR, 2000). The regional concentrations reported in this reference document are:

- 2.4×10^{-17} to 1.4×10^{-16} $\mu\text{Ci/mL}$ for uranium-238
- 1.6×10^{-17} $\mu\text{Ci/mL}$ for thorium-230
- 1.6×10^{-17} $\mu\text{Ci/mL}$ for radium-226
- 2.7×10^{-15} to 2.7×10^{-14} $\mu\text{Ci/mL}$ for lead-210

Radionuclide concentrations at the site were also compared to effluent concentrations provided in 10 CFR 20 Appendix B Table 2 and are summarized in Table 3 as a percentage of effluent concentrations. The effluent concentration specified for lead-210 is 6×10^{-13} $\mu\text{Ci/mL}$. The most conservative effluent concentration was applied to thorium-230 (2×10^{-14} $\mu\text{Ci/mL}$) and Class D and W limits were applied to natural uranium (3×10^{-12} $\mu\text{Ci/mL}$) and radium-226

(9×10^{-13} $\mu\text{Ci/mL}$), respectively. In terms of comparison to 10 CFR 20 Appendix B Table 2 effluent concentrations, site data can be characterized as follows:

- Natural uranium was 0.00% of the effluent concentration in all cases.
- Thorium-230 was between -0.01% and 0.19% of the effluent concentration.
- Radium-226 was between -0.01% and 0.01% of the effluent concentration.
- Lead-210 was between 0.28% and 6.83% of the effluent concentration.

With regard to NRC RG 4.14 Section 5 LLDs, Table 3 shows that LLDs for the 2013-2014 sampling program were lower than the respective NRC RG 4.14 Section 5 guidance in every case. The LLDs were also lower than the respective 10 CFR 20 Appendix B Table 2 effluent concentrations. For the periods where LLDs for uranium were exceeded in 2007-2008, uranium concentrations ranged between two and three orders of magnitude higher than those detected during the corresponding periods in 2013-2014. As a result, the 2013-2014 results are used in place of the 2007-2008 results for purposes of calculating summary statistics in Table 4.

With regard to data quality, laboratory quality assurance (QA) samples for 2013-2014 monitoring periods included method blanks, laboratory control spikes, matrix spike, matrix spike duplicate, and duplicate samples. Radionuclides were not detected above detection limits in any method blanks resulting in no data being blank qualified. Results for laboratory control spikes, matrix spikes, matrix spike duplicates, and duplicate samples were within acceptable percent recovery and relative percent difference limits specified by the laboratory for the methods used.

No field blank filters were submitted to the laboratory during the 2013-2014 monitoring period; Powertech will submit such filters to the laboratory during operational monitoring until an acceptable range of average concentrations can be stated with 95% confidence. Results for blank filters will then be kept on file for use as needed.

Copies of laboratory reports for the 2013-2014 monitoring periods, including QA sample results, are provided in Appendix D. Laboratory reports for earlier QA sample results and monitoring periods are provided in the Baseline Radiological Report (ML091040360).

3.0 Supplemental Radon Data

Radtrak passive track etch radon detectors supplied by Landauer, Inc. of Glenwood, Illinois (Landauer) were co-located with AMS-08, AMS-09 and AMS-BKG samplers to measure ambient radon-222. For quality control purposes, a duplicate track etch radon detector was placed at the AMS-BKG location.

Ambient radon-222 periods monitored were:

Track etch radon detectors at AMS-08, AMS-09 and AMS-BKG

2013 Pre:	December 5, 2012 – January 10, 2013 (Landauer Process No. A22591)
2013 Q1:	January 10, 2013 – March 28, 2013 (Landauer Process No. A22634)
2013 Q2:	March 28, 2013 – June 28, 2013 (Landauer Process No. A22795)
2013 Q3:	June 28, 2013 – October 2, 2013 (Landauer Process No. A22814)
2013 Q4:	October 2, 2013 – January 3, 2014 (Landauer Process No. A22863)

At the end of each monitoring period, track etch detectors were returned to Landauer for measurement of average radon-222 concentrations. Results are summarized in Table 5 and Landauer data reports are provided in Appendix E.

First quarter ambient radon concentrations were less than the detection limit of 0.4 pCi/L at all locations; frozen ground conditions in combination with the use of a lower-sensitivity detector (30.0 pCi/L-days versus 6.0 pCi/L-days) are possible causes. As shown in Table 5, the detection limit (0.4 pCi/L) was assumed for summary purposes. Higher-sensitivity detectors were used during the second, third and fourth quarter. Second quarter ambient radon concentrations ranged between 1.4 and 2.1 pCi/L at AMS-08 and AMS-BKG, respectively. Third quarter ambient radon concentrations ranged between 0.6 and 1.7 pCi/L at AMS-08 and AMS-BKG, respectively. Fourth quarter concentrations ranged from less than the detection limit of 0.06 pCi/L at AMS-08 up to 0.8 pCi/L at AMS-09; as shown in Table 5, the detection limit of 0.06 pCi/L for AMS-08 was assumed for summary purposes.

In terms of effluent concentrations, measured values exceed the 0.1 pCi/L 10 CFR 20 limit for radon-222 with daughters present. On average, however, measured values are within the

Table 5. Radon-222 Concentrations at Operational Air Monitoring Station Locations

Location	Starting Date	Ending Date	Radon-222 Conc. (μCi/ml)	Error ± (μCi/ml)	LLD (μCi/ml)	Average Rn-222 Conc. (μCi/ml)	Standard Deviation of Average (μCi/ml)	Min. Rn-222 Conc. (μCi/ml)	Max. Rn-222 Conc. (μCi/ml)	% of Effluent Conc. (limit is 1E-10 μCi/ml)
AMS-1	8/14/2007	9/27/2007	1.00E-09	-	6.82E-10	7.23E-10	2.09E-10	4.92E-10	1.00E-09	1000
	9/27/2007	2/1/2008	7.00E-10	-	2.00E-10					700
	2/1/2008	5/17/2008	7.00E-10	7.10E-11	2.83E-10					700
	5/17/2008	7/17/2008	4.92E-10	-	4.92E-10					492
AMS-1 ^a	8/14/2007	9/27/2007	1.00E-09	-	6.82E-10	5.73E-10	2.88E-10	4.00E-10	1.00E-09	1000
	9/27/2007	2/1/2008	4.00E-10	-	2.00E-10					400
	2/1/2008	5/17/2008	4.00E-10	5.20E-11	2.83E-10					400
	5/17/2008	7/17/2008	4.92E-10	-	4.92E-10					492
AMS-2	8/15/2007	9/27/2007	2.20E-09	-	6.98E-10	1.15E-09	7.62E-10	4.92E-10	2.20E-09	2200
	9/27/2007	2/1/2008	1.20E-09	-	2.00E-10					1200
	2/1/2008	5/17/2008	7.00E-10	7.00E-11	2.83E-10					700
	5/17/2008	7/17/2008	4.92E-10	-	4.92E-10					492
AMS-3	8/14/2007	9/27/2007	1.20E-09	-	6.82E-10	1.40E-09	9.30E-10	4.92E-10	2.70E-09	1200
	9/27/2007	2/4/2008	1.20E-09	-	2.00E-10					1200
	2/4/2008	5/17/2008	2.70E-09	7.90E-11	2.91E-10					2700
	5/17/2008	7/17/2008	4.92E-10	-	4.92E-10					492
AMS-4	8/14/2007	9/24/2007	1.20E-09	-	7.32E-10	1.47E-09	9.98E-10	5.75E-10	2.90E-09	1200
	9/27/2007	2/4/2008	1.20E-09	-	2.00E-10					1200
	2/4/2008	5/17/2008	2.90E-09	7.80E-11	2.91E-10					2900
	5/17/2008	7/17/2008	5.75E-10	-	4.92E-10					575
AMS-8	12/5/2012	1/10/2013	5.60E-09	2.50E-10	1.67E-10	1.61E-09	2.28E-09	6.00E-11	5.60E-09	5600
	1/10/2013	3/28/2013	4.00E-10	5.00E-11	3.90E-10					400
	3/28/2013	6/28/2013	1.40E-09	8.00E-11	6.52E-11					1400
	6/28/2013	10/2/2013	6.00E-10	5.00E-11	6.25E-11					600
	10/2/2013	1/3/2014	6.00E-11	1.00E-11	6.45E-11					60

Table 5. Radon-222 Concentrations at Operational Air Monitoring Station Locations (concluded)

Location	Starting Date	Ending Date	Radon-222 Conc. (μCi/ml)	Error ± (μCi/ml)	LLD (μCi/ml)	Average Rn-222 Conc. (μCi/ml)	Standard Deviation of Average (μCi/ml)	Min. Rn-222 Conc. (μCi/ml)	Max. Rn-222 Conc. (μCi/ml)	% of Effluent Conc. (limit is 1E-10 μCi/ml)
AMS-9	12/5/2012	1/10/2013	6.80E-09	2.80E-10	1.67E-10	2.24E-09	2.62E-09	4.00E-10	6.80E-09	6800
	1/10/2013	3/28/2013	4.00E-10	4.00E-11	3.90E-10					400
	3/28/2013	6/28/2013	2.00E-09	1.00E-10	6.52E-11					2000
	6/28/2013	10/2/2013	1.20E-09	7.00E-11	6.25E-11					1200
	10/2/2013	1/3/2014	8.00E-10	5.00E-11	6.45E-11					800
AMS-BKG	8/14/2007	9/24/2007	2.00E-09	-	7.32E-10	2.12E-09	2.44E-09	4.00E-10	8.40E-09	2000
	9/27/2007	2/1/2008	1.60E-09	-	2.00E-10					1600
	2/1/2008	5/17/2008	1.70E-09	8.10E-11	2.83E-10					1700
	5/17/2008	7/17/2008	4.95E-10	-	4.92E-10					495
	12/5/2012	1/10/2013	8.40E-09	3.20E-10	1.67E-10					8400
	1/10/2013	3/28/2013	4.00E-10	4.00E-11	3.90E-10					400
	3/28/2013	6/28/2013	2.10E-09	1.00E-10	6.52E-11					2100
	6/28/2013	10/2/2013	1.70E-09	9.00E-11	6.25E-11					1700
	10/2/2013	1/3/2014	7.00E-10	5.00E-11	6.45E-11					700
AMS-BKG ^a	8/14/2007	9/27/2007	2.70E-09	-	6.82E-10	1.97E-09	1.93E-09	4.00E-10	6.70E-09	2700
	9/27/2007	2/1/2008	1.50E-09	-	2.00E-10					1500
	2/1/2008	5/17/2008	1.50E-09	8.10E-11	2.83E-10					1500
	5/17/2008	7/17/2008	4.92E-10	-	4.92E-10					492
	12/5/2012	1/10/2013	6.70E-09	2.80E-10	1.67E-10					6700
	1/10/2013	3/28/2013	4.00E-10	4.00E-11	3.90E-10					400
	3/28/2013	6/28/2013	2.10E-09	1.00E-10	6.52E-11					2100
	6/28/2013	10/2/2013	1.60E-09	9.00E-11	6.25E-11					1600
	10/2/2013	1/3/2014	7.00E-10	5.00E-11	6.45E-11					700

a. duplicate track etch radon detector

range of reported worldwide ambient background radon concentrations, which are 0.027 to 2.7 pCi/L (UNSCEAR, 2000).

Data agreement between the AMS-BKG track etch detector and the AMS-BKG duplicate track etch detector was good; relative percent differences (RPDs) ranged between 0 and 2%.

4.0 Supplemental Direct Radiation Data

Environmental thermoluminescent dosimeters (TLDs) supplied by Landauer were co-located with AMS-08, AMS-09 and AMS-BKG samplers to measure ambient gamma dose rates (direct radiation). For quality control purposes, a duplicate TLD was placed at the AMS-BKG location.

The direct radiation periods monitored were:

TLDs at AMS-08, AMS-09 and AMS-BKG

2013 Pre:	December 5, 2012 – January 10, 2013 (Landauer Work Order 1302511954)
2013 Q1:	January 10, 2013 – March 28, 2013 (Landauer Work Order 1309410992)
2013 Q2:	March 28, 2013 – June 28, 2013 (Landauer Work Order 1323511313)
2013 Q3:	June 28, 2013 – October 9, 2013 (Landauer Work Order 1328412087)
2013 Q4:	October 9, 2013 – January 3, 2014 (Landauer Work Order 1401011686)

Ambient gamma dose results are summarized in Table 6 and Landauer reports for each TLD are provided in Appendix F. Reported doses were converted to an adjusted daily dose by dividing the dose by the number of days between shipment of TLDs to the site and receipt of TLDs back at the Landauer testing facility. To obtain an estimate of the annual dose equivalent, the average daily dose was multiplied by 365 days.

The resulting average annual doses for AMS-08, AMS-09 and AMS-BKG are 95, 120 and 114 millirems per year (mrem/yr), respectively. These compare favorably with the baseline direct gamma-ray survey data, which averaged the equivalent of approximately 96 mrem/yr (TR RAI 2.9-27 (b) [ML11208B714]) and the average worldwide exposures to natural radiation of 60 to 160 mrem/yr (UNSCEAR, 2000).

Data agreement between the AMS-BKG TLD and the AMS-BKG duplicate TLD was good; RPDs ranged between 0.7 and 4.2%, averaging 2.6% over the five periods monitored.

Table 6. Ambient Gamma Dose Rates at Operational Air Monitoring Station Locations

Location	Starting Date	End Date	Ambient Dose (mrem)	Adjusted Dose Rate (mrem/day) ^b	Projected Annual Doses (mrem)
AMS-01	8/15/2007	2/4/2008	-	NC	NC
	2/4/2008	5/17/2008	37.2 ^a	0.260	
	5/17/2008	7/17/2008	57.7 ^a	0.412	
AMS-02	8/16/2007	2/4/2008	-	NC	NC
	2/4/2008	5/17/2008	-	NC	
	5/17/2008	7/17/2008	54.0	0.386	
AMS-03	8/15/2007	2/4/2008	-	NC	NC
	2/4/2008	5/17/2008	38.6	0.27	
	5/17/2008	7/17/2008	-	NC	
AMS-04	8/15/2007	2/4/2008	62.4	0.297	114
	2/4/2008	5/17/2008	36.1	0.252	
	5/17/2008	7/17/2008	54.3	0.388	
AMS-08	12/5/2012	1/10/2013	19.2	0.278	95
	1/10/2013	3/28/2013	30.5	0.275	
	3/28/2013	6/28/2013	44.1	0.261	
	6/28/2013	10/9/2013	28.6	0.223	
	10/9/2013	1/3/2014	26.4	0.261	
AMS-09	12/5/2012	1/10/2013	23.3	0.338	120
	1/10/2013	3/28/2013	36.9	0.332	
	3/28/2013	6/28/2013	51.2	0.303	
	6/28/2013	10/9/2013	41.4	0.323	
	10/9/2013	1/3/2014	34.5	0.342	
AMS-BKG	8/15/2007	2/4/2008	68.8 ^a	0.328	118
	2/4/2008	5/17/2008	40.5 ^a	0.283	
	5/17/2008	7/17/2008	58.5 ^a	0.418	
	12/5/2012	1/10/2013	22.1 ^a	0.320	
	1/10/2013	3/28/2013	33.2 ^a	0.299	
	3/28/2013	6/28/2013	50.4 ^a	0.298	
	6/28/2013	10/9/2013	37.8 ^a	0.295	
	10/9/2013	1/3/2014	35.6 ^a	0.352	

a. Value is the average of the TLD result and the duplicate TLD result.

b. Dose rate adjusted by dividing the reported dose by the time from shipment of dosimeters to the site and receipt of dosimeters back at the Landauer testing facility.

NC = Not Calculated due to missing data

5.0 Summary

Supplemental air particulate, radon and direct radiation samples were collected at the Dewey-Burdock site to satisfy commitments made in Sections 1.0 and 6.0 of Powertech's supplemental sampling plan (ML12305A056) and preoperational sampling guidance in NRC RG 4.14 Section 1.1.1.

Two new air particulate stations (AMS-08 and AMS-09) and the background location (AMS-BKG) were monitored for one year. Filters were composited and analyzed quarterly for RG 4.14 preoperational radionuclides.

In addition, particulate at four existing air monitoring stations (AMS-01, AMS-02, AMS-03, and AMS-04) was collected during two periods and analyzed for uranium to replace data collected in 2007 and 2008 for which RG 4.14 LLDs were exceeded.

Lastly, radon-222 and direct radiation data were collected at AMS-08, AMS-09 and AMS-BKG to meet preoperational guidance in RG 4.14.

Data collected indicate 2007-2008 and 2013-2014 radionuclide concentrations, with the exception of those where the LLD was exceeded for uranium in 2007-2008, are similar to each other and also to background concentrations for natural uranium, thorium-230, radium-226, lead-210, radon-222, and direct gamma radiation in air.

In terms of 10 CFR 20 Appendix B Table 2 effluent concentrations, radionuclides in air particulate were between 0 and 6.83% of their respective limits while preoperational (baseline) radon-222 exceeded the effluent concentration in all cases.

Data quality reviews indicate RG 4.14 LLDs were met for air particulate samples confirming the adequacy of volumes sampled and data recovery percentages. In addition, laboratory quality control results were within specified control limits and RPDs for duplicate track etch and TLDs were within acceptable ranges.

6.0 References

10 CFR 20. "Standards for Protection Against Radiation." Code of Federal Regulations: Office of the Federal Register National Archives and Records Administration. Washington, D.C. 1 January 1999.

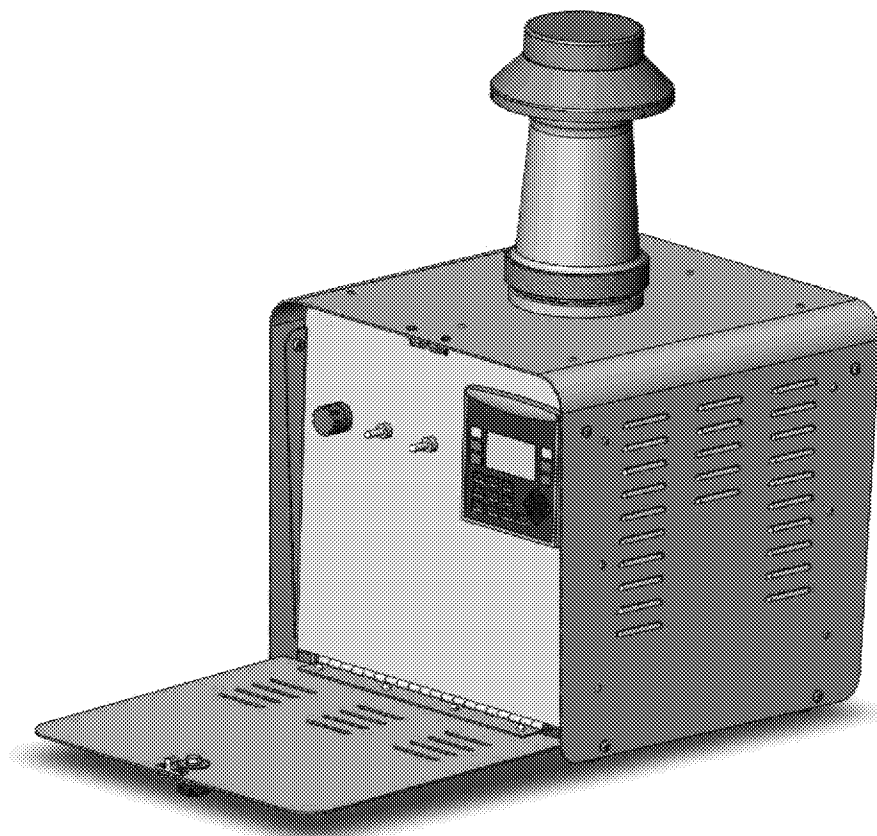
NRC, 1980. NRC Regulatory Guide (RG) 4.14, Revision 1, *Radiological Effluent and Environmental Monitoring at Uranium Mills*.

United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), 2000. UNSCEAR Report to the General Assembly, *Sources and Effects of Ionizing Radiation, Annex B*.

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Appendix A
Hi-Q Model CF-5624-WR
Operation and Maintenance Manual

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CF-5624-WR

**BRUSHLESS, AUTOMATIC FLOW CONTROL DC POWERED
LOW VOLUME AIR SAMPLER FOR CONTINUOUS USE**

(REV. NR 10/23/13)

INTRODUCTION

This low volume air sampler is 24 VDC powered and uses an efficient brushless motor blower. The motor speed is controlled by a programmable logic controller (PLC) that accepts an input from a pressure sensor that measures the differential pressure created across the venturi on the inlet of the blower. Any changes in the operator's pre-set flow rate due to changes in dust loading, barometric pressure and temperature is detected by the pressure sensor. The PLC compensates for these changes by adjusting the motor speed to maintain that pre-set flow rate. The PLC also displays the flow, total flow and elapsed time.

The CF-5624-WR's brushless blower is speed controlled rather than incorporating air choke devices such as venturis or orifice plates commonly found in units which run their motor at full speed.

The maximum, open-air flow rate is 4.5 CFM. The maximum flowrate with a filter depends on the pressure drop of the filter media, but the unit is usually calibrated for a flow range between 1 and 2.5 CFM (The flow rate can also be calibrated and displayed in CMM). This allows the extra pump capacity to maintain a pre-set flow rate within this calibration range as the filter loads with particulate.

The CF-5624-WR programming includes a 7 day programmable timer that allows the air sampler to be turned ON and OFF at pre-programmed times of the week. The unit can be programmed to turn ON and OFF at five different times in each day of the week. The sampler can also be run continuously.

The CF-5624-WR has a weather resistant, enclosure and an omni-directional weather resistant inlet that threads on to the units 4" filter holder. The WRA-4CF adapter is available to allow the use of CF series filter holders for 47mm or 2" filters.

Unpacking the unit

Unpack unit and inspect for any possible shipping damage. Report any damage IMMEDIATELY to the CARRIER.

Placement of the unit

The CF-5624-WR is intended for outdoor use (although it is small enough to be used indoors as well). The CF-5624-WR should be mounted so that it is free from wind shadows such that it will collect particulate with equal efficiency as the wind direction changes. Facing the instrument panel north will make the LCD screen easier to read during daylight hours.

SYSTEM DESCRIPTION

Cabinet

The CF-5624-WR cabinet is weather resistant and has been designed for continuous, outdoor sampling. It is as-close-to a “weather proof” air sampler as one can get. It is not possible to make a completely “weather proof” air sampler due to its nature of needing to get air in and out of the cabinet. As such, the CF-5624-WR will not float or function under water. It will also not work if it is buried in or filled with snow.

Control Panel

The CF-5624-WR control panel houses the PLC display, the ON/OFF switch, the continuous/timer mode switch, and the fuse holder. The flow setpoint can be increased or decreased using the up and down arrow keys on the PLC display. The CONTINUOUS/TIMER switch selects between continuous sampling, and timer controlled sampling. If no timer modes are programmed into the PLC, placing this switch in “TIMER” will turn off the blower, while still enabling viewing of the display screen.

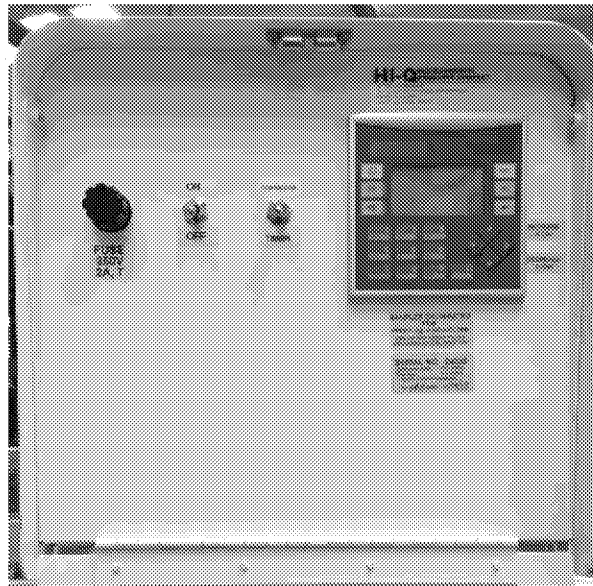


Figure 1 Front Control Panel

Electronics

The PLC displays the flow setpoint, the instantaneous flow rate, the total volume sampled and the elapsed time. The CF-5624-WR features electronic flow control such that the PLC will control the speed of the blower to maintain the setpoint flow rate. The PLC unit has built-in firmware which is pre-programmed to operate with the pressure sensor; no further adjustment is required. The PLC and pressure sensor are durable enough to operate in harsh environments, but they are sensitive to impacts.

Fuse

The CF-5624-WR controller box has a 2 AMP fuse for the electronics and the motor mounted on the side of the box.

Electrical

The CF-5624-WR requires 24VDC power. The CF-5624-WR has two power cords. The upper power cord is the positive “+” power cord and is marked by a “+” symbol on the

cabinet and by red heat shrink on the cord. The lower power cord is negative “-” and is marked by a “-” symbol on the cabinet and the cord itself is all black (shown in Figure 2). Mating power cords are supplied for connection to a battery bank. Be sure the the power cord with the red heat shrink on each end is connected to the positive “+” side of the battery bank output and that the black power cord is connected to the negative “-” side of the battery bank output. If the power cords from the battery supply are connected correctly, the power cord connectors will then make it impossible to plug the cords together incorrectly. Power cord extensions are available if needed. A wiring diagram for the CF-5624-WR is shown on at the end of this manual in drawing “CF-5624-WIRE”.

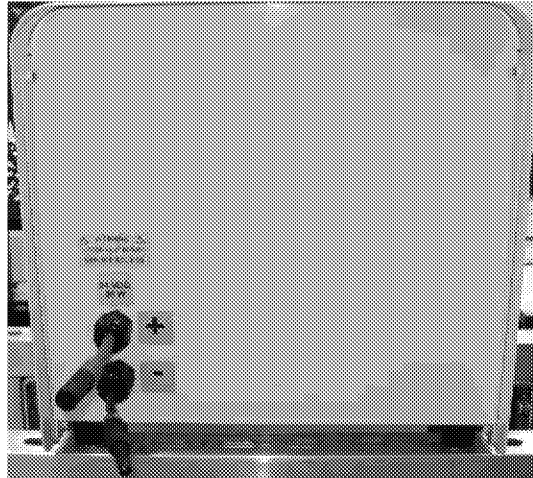


Figure 2 Back Panel

Care and feeding

The CF-5624-WR should require no maintenance for many years. Be sure to close the front protective panel when not in use. While the control panel is weather resistant, the protective panel shields the control panel from the worst of the elements. Be careful to keep debris from falling into the inlet, or else the blower could be damaged. It is also possible the the pressure ports on the inlet venturi could be come clogged or contaminated and compromise the flow calibration.

Opening the cabinet

The CF-5624-WR does not contain any components that require regular service. Should there be a need to open the CF-5624-WR cabinet, be sure to disconnect the cabinet from power. Next, remove the eight 10-32 screws on the sides of the cabinet. Lift the upper portion of the cabinet, and rest it next to the base as shown in Figure 3 . Be careful not to overextend the blower power and pressure sensor wires. When replacing the top of the cabinet, be sure to position the latch towards the front, and be careful not to pinch any of the blower power or sensor wires.

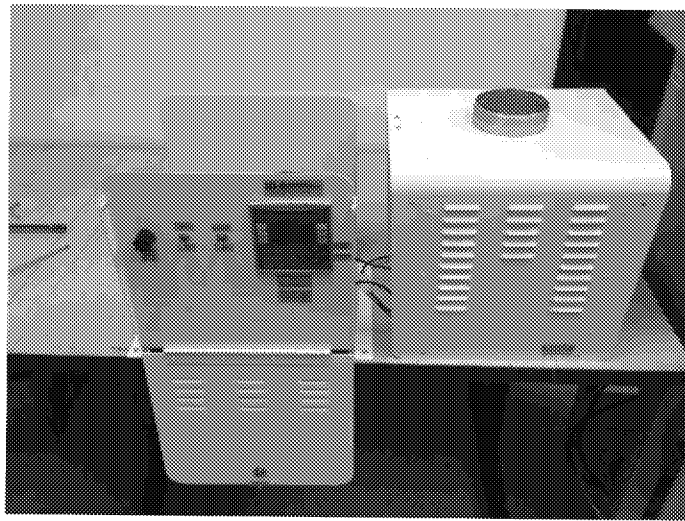
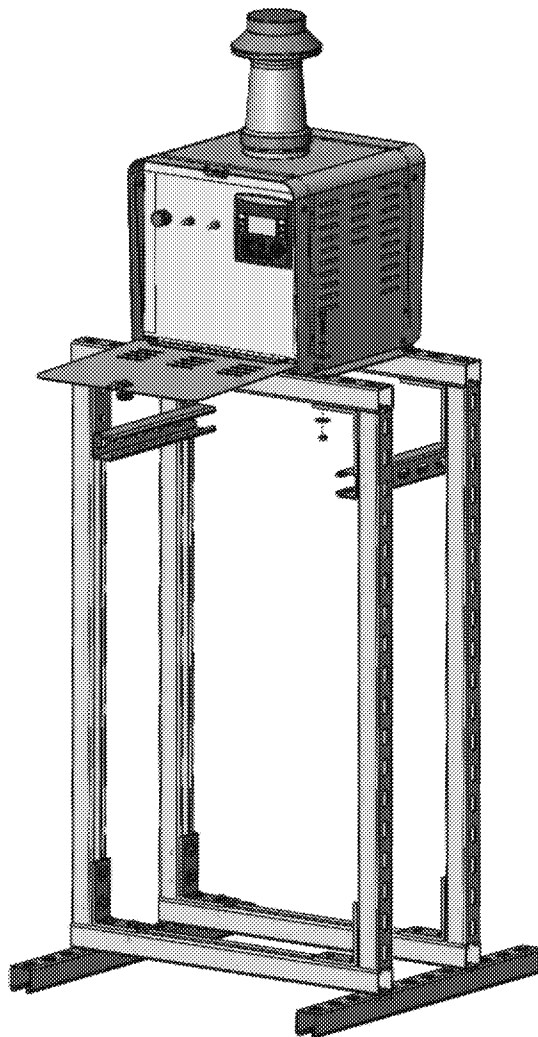


Figure 3 Opening the Cabinet

Mounting on Optional Stand

The CF-5624-WR can be mounted on an optional stand as shown below.



OPERATION

Remove rainhat inlet by unscrewing it from the 4" filter holder on top of the sampler.

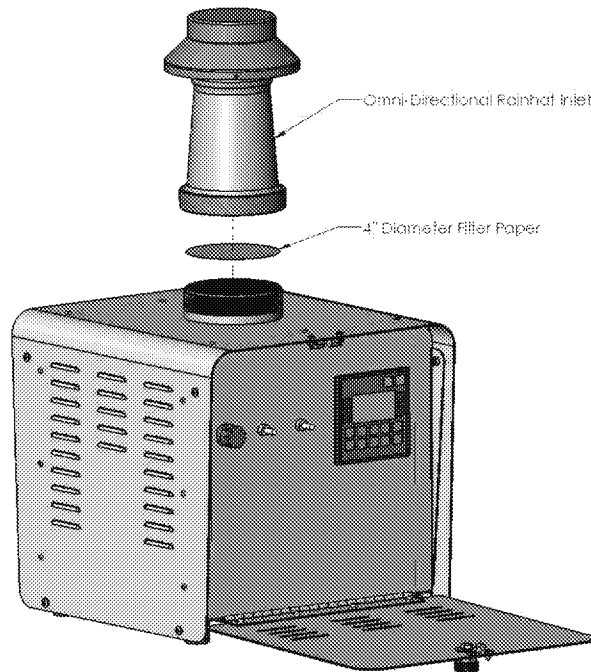


Figure 4 Filter Holder Assembly

Install a new filter of the type that the sampler has been calibrated with as designated on the sticker below the PLC display. This sampler is normally calibrated for 4" diameter filter paper, but can be calibrated for other sizes of filter paper. If a different type or size of filter paper is to be used, the CF-5624-WR will need to be recalibrated. The maximum flow rate of any air sampler is dependent on the pressure drop of the paper and the size. High pressure drop paper or smaller size paper will reduce the maximum flow. For automatic flow control, the flow setpoint will need to be set to some rate that is less than maximum obtainable. When the flow is reduced by dust loading, the blower speed will increase to compensate for the reduced flow until the maximum speed of the blower is reached. For this reason, the sampler should usually not be set for a flow above 2 CFM. This will allow some reserve motor capacity for maintaining that 2 CFM when dust loading increases the pressure drop across the filter paper.

With the unit ready for operation, turn on the ON/OFF SWITCH located on the front panel. The screen backlight will come on for a couple of seconds, the screen will then go dark for a couple of seconds and then the screen as shown in Figure 5 will be displayed a few seconds.

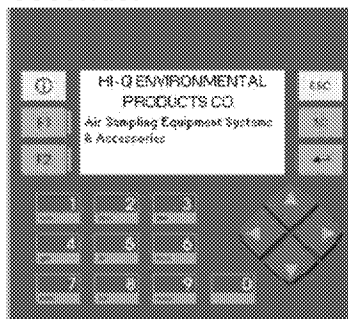


Figure 5: Startup Display

After 5 seconds, the screen shown in Figure 6 will be displayed. Move the mode selection switch (next to the ON/OFF switch) to either continuous or timer mode.

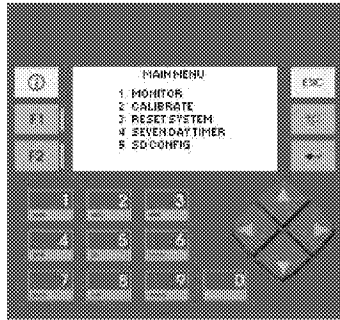


Figure 6: Main Menu

The keypad buttons and the corresponding functions in this menu are:

- 1 Monitor
- 2 Calibration
- 3 Reset Parameters
- 4 Seven Day Timer
- 5 SD Card Configuration

Monitor screen

Press “1” from the “Main Menu” to enter the Monitor screen as shown in Figure 7. The parameters displayed in this screen are:

SET POINT: User pre-set flow rate in CFM (or CMM)
FLOW RATE: Instantaneous flow rate in CFM
TOTAL FLOW: Total volume of air sampled in CF
ELAPSED TIME: Elapsed sample time in Hours and Tenths of Hours

Press “ESC” to return to the main menu.

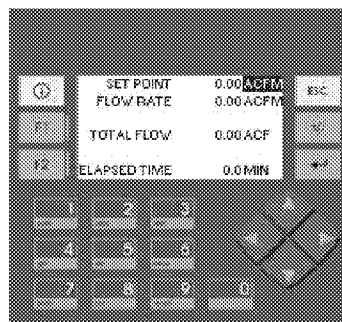


Figure 7: Monitor Screen

Calibration screen

Press “2” from the “Main Menu” to enter the Calibration Password screen (Figure 14). The calibration procedure and screens are described in detail in the next chapter

Reset Parameters screen

Press “3” from the “Main Menu” to enter the Reset Parameters screen where the totalizer and elapsed timer can be reset to zero. The following screen, shown in Figure 8 prompts the user to enter a password. The factory pre-set password for the RESET functions is 250.

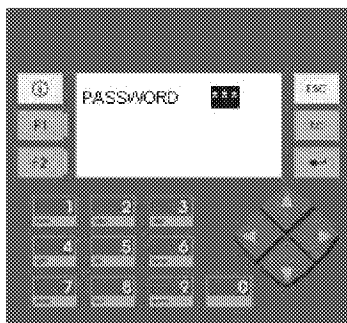


Figure 8: RESET Password Entry

Enter 250 using the keypad and press ENTER (or ESC to return to Main Menu). Press the RESET button from the following screen (shown in Figure 9) to reset the totalizer and elapsed timer to zero (or ESC to return to Main Menu without resetting). Press ESC to return to the Main Menu

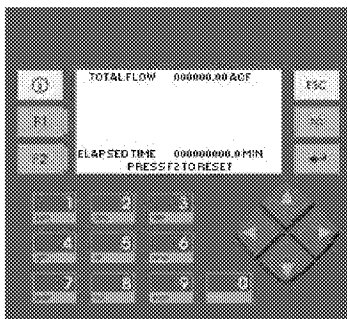


Figure 9: RESET Totalizer and Elapsed Timer

Seven Day Timer

The Seven Day Timer feature is used to turn the air sampler ON and OFF at a programmed time of the day and week. Press “4” from the “Main Menu” to enter the screen shown in Figure 10 that allows the user to enter the current date and time.

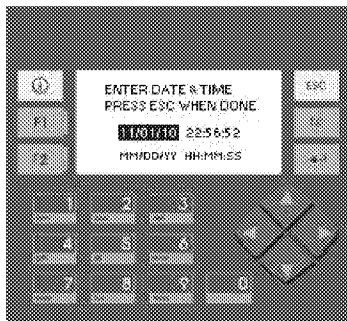


Figure 10: Set Current Date & Time

Press “ESC” after entering the current date and time. If the date and time displayed is screen already correct, press “ESC”. The following screen (Figure 11) allows the user to enter the times at which the air sampler needs to be turned ON and OFF.

Press ENTER to activate keypad entry and Press UP or DOWN arrow until the desired start day is displayed and then press ENTER.

Press RIGHT arrow to move the cursor to next variable, press ENTER and enter the start time (HH) and then press ENTER.

Press RIGHT arrow to move the cursor to next variable, press ENTER and enter the start time (MM) and then press ENTER.

Repeat the same steps to enter the stop day and time. This screen allows the user to enter four different start and stop times.

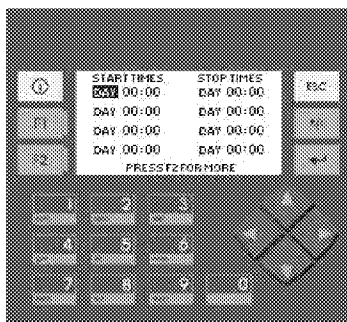


Figure 11: Day and Time Entry

Pressing F2, if additional start and stop times are required allows the user to enter three more start and stop day & times.

SD Card Config

The CF-5624WR includes an optional Micro SD card for data storage and is programmed to log data at user set time intervals. The default interval for data storage is 5 minutes. The unit also includes a USB reader for the Micro SD card that allows the user to open the log file (.csv) directly in Excel or any other standard spreadsheet processing software. The file name for the data log is user settable through the front panel. Press 5 from Main Menu to enter the screen shown in Figure 12 that allows the user to enter the file name for the data logfile and data logging frequency.

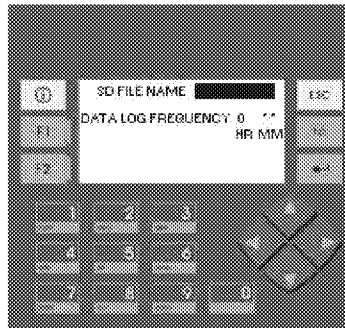


Figure 12: SD Card Config

CALIBRATION

Calibration Check Devices and Configuration

The unit is calibrated before leaving the factory. There is no need to calibrate before use. Protocol requires that all air flow devices should be re-calibrated at least once a year against a traceable standard. Operational calibration verification can be performed once a month if you own a calibration check device.

The validity of the CF-5624-WR calibration can be checked in the field with a number of types of calibration units.

HI-Q suggests using the HFC-XXC-S where XX is the maximum calibrated flow rate. The unit fits with an adapter FHA-4CF to the top of the paper loaded filter holder. The correct configuration for flow calibration is shown below.

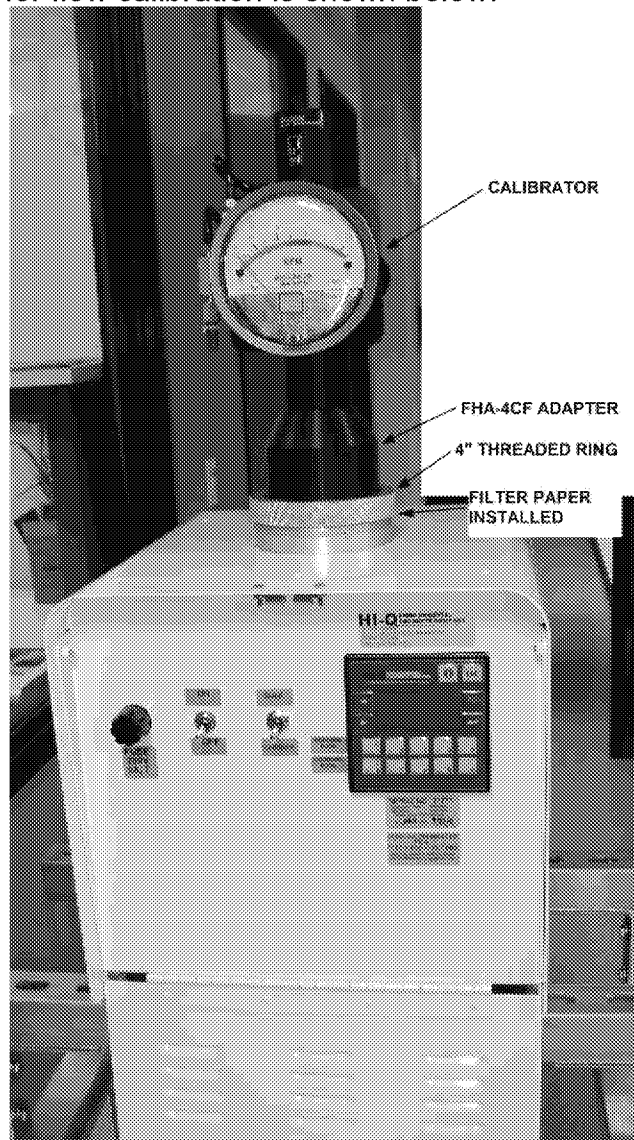


Figure 13: Calibration Configuration

Calibration Check Procedure

Turn on the unit and adjust the setpoint to the desired flow rate and allow the sampler to adjust the flow rate to match the setpoint. Once the sampler flow rate has stabilized, verify that the indicated flow rate of the sampler matches the flow rate shown on the HFC calibrator within 5%. If the difference between the displayed flow rates is more than 5%, then proceed with the re-calibration procedure.

Re-calibration can also be done at our factory in San Diego, California and is re-certified against NIST standards.

Re-calibration

From the Main Menu press “2” to enter into the “Calibration Password” display shown in Figure 14. The factory pre-set password for Calibration is 250.

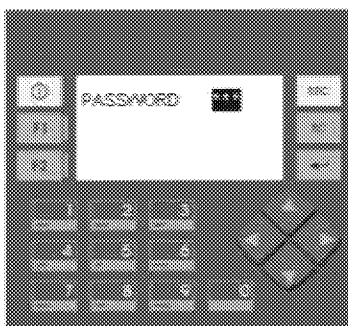


Figure 14: CALIBRATION Password Entry

Enter 250 using the keypad and press OK (or ESC to return to Main Display). When the password is accepted the PLC enters Unit Selection Screen (Figure 15). Press Enter and UP or DOWN to select calibration units to CFM or CMM and press ENTER.

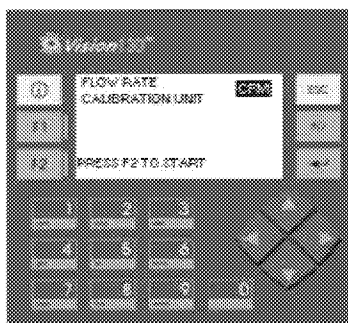


Figure 15: Unit Selection

Press F2 after selecting the unit to enter calibration screen (Figure 16). To cancel the calibration procedure and retain the previous calibration, press ESC at any stage of the calibration procedure.

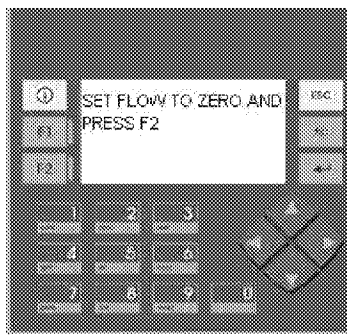


Figure 16: Zero Calibration

Move the “Continuous/Timer” switch to the “Timer” position (which will turn off the blower) and wait for 30 seconds for the blower to completely stop and press F2. The zero point (0 SCFM) will be set and the “Calibration Point 1” screen (Figure 17) will be displayed next.

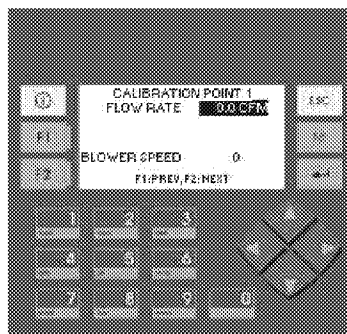


Figure 17: Calibration Point 1

Move the “Continuous/Timer” switch to the “Continuous” position. To change the flow rate display point of the calibration table, press ENTER and key in the calibration flow rate value and press ENTER. The “Calibration Point 1” screen will be updated with the new flow rate value. Press UP or DOWN to increase or decrease the speed of the blower, thereby changing the flow rate, until the flow rate displayed by the Air Flow Calibrator (HFC-XXC-S) is equal to the flow rate displayed by the unit and then press F2.

Repeat the above steps up to the 15 of calibration points. Press F1 to return to previous calibration point. In case of error or doubt, press ESC to restore the previous calibration table and start over again. After the last calibration point, press F2 to finish the calibration.

Note that the CF-5624-WR requires 15 calibration points. Flow versus differential pressure is a squared function and a reliable flow calibration for the CF-5624-WR requires this number of points.

To have the unit re-calibrated at the HI-Q factory, use the following steps.

1. Unplug the two power input cables from the CF-5624-W. Be sure that the power leads from the solar power station or battery supply are secured safely and do not touch one another.
2. Carefully package and send the CF-5624-WR to HI-Q, with a completed re-calibration purchase order. There is no need to ship the omni-direction rainhat inlet.

Be sure to cover the inlet of the CF-5624-WR with a plastic bag secured by a rubber band to prevent packaging materials from getting into the blower. HI-Q recommends the entire sampler be sealed in a large garbage bag prior to packaging.

Contact our calibration department (858-549-2820) to request re-calibration cost and turn around time.

OPTIONS AVAILABLE

Contact our engineering department (858-549-2820) to incorporate any of the following features into the CF-5624-WR unit.

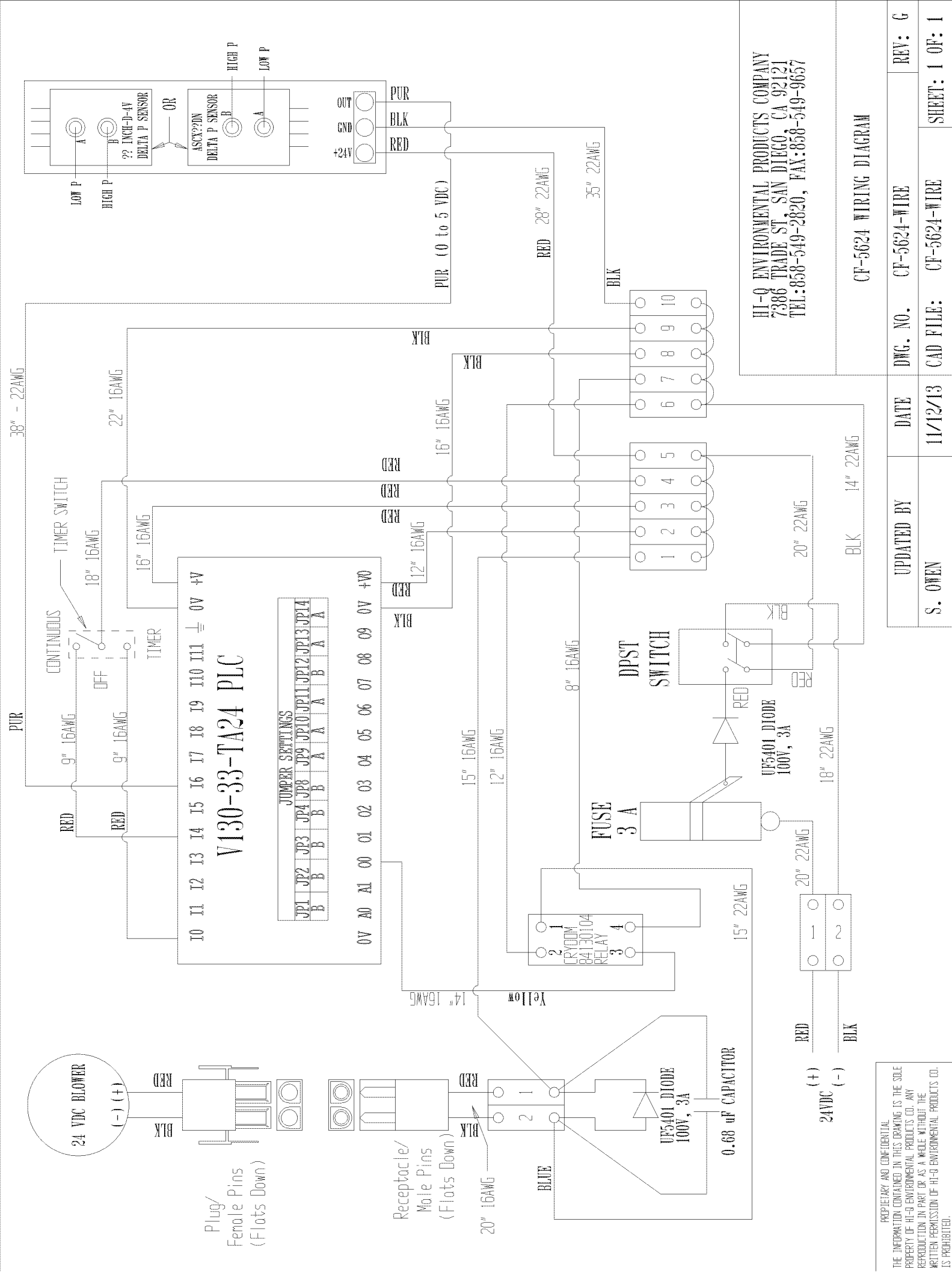
- RS-232/RS-485 communication
- 4-20 mA or 0-10 VDC scaled analog output
- Alarm features
- CDMA/GSM communication
- Remote Access software
- Data Acquisition Software

MAINTENANCE

The Blower and Electronics are all maintenance free and must be factory serviced or replaced if defective.

**HI-Q'S CF-5624-WR
SPARE PARTS LIST**

PART NUMBER	PART DESCRIPTION	QTY REQ.
CF5624-01	24VDC Brushless Blower	1
CF5624-02	PLC Controller	1
CF5624-03	Blower Power Cord	1
CF5624-04	2A Fuse	1
CF5624-05	Power cords (one pair marked "+", and "-").	1 pair
CF5624-06	Main power toggle switch SPST	1
CF5624-07	Mode switch for continuous or timer, DPDT	1
CF5624-08	Solid State Relay	1
CF5624-09	Capacitor/Diode	1
CF5624-11	Fuse Holder	1
CF5624-12	15' Power cord extensions (pair)	1 pair



Appendix B

Calibration Records

Calibration Dates and GPS Coordinates for Dewey-Burdock Operational Air Monitoring Stations	
AMS - 01 (Daniel Ranch) - S/N 16889 - GPS Coordinate Location 43.46845 103.94325 (Calibrated 12/5/2012)	
AMS - 02 (Spencer Ranch) - S/N 16884 - GPS Coordinate Location 43.47754 103.99491 (Calibrated 11/19/2012)	
AMS - 03 (Beaver Creek Ranch) - S/N 16886 - GPS Coordinate Location 43.49902 104.05367 (Calibrated 12/5/2012)	
AMS - 04 (Putnam Residence) - S/N 16891 - GPS Coordinate Location 43.53039 104.03719 (Calibrated 12/3/2012)	
AMS - 08 (Englebert Ranch) - S/N 16885 - GPS Coordinate Location 43.45734 103.93813 (Calibrated 12/5/2012)	
AMS - 09 (Solar GCC) - S/N 22984 - GPS Coordinate Location 43.50714 104.03066 (Factory Calibrated)	
AMS - BKG (Andersen Ranch) - S/N 16890 - GPS Coordinate Location 43.43837 104.03284 (Calibrated 11/20/2012)	

Hi-Q Sampler Calibration Record			
Project: Dewey-Burdock			
Date: 12/5/2012			
Sampler ID: AMS-01 (S/N 16889)			
Calibrated By: L. Scheinost			
Time: 1233			
Set Flow: 34.0			
Calibration			
	Sensor Output	Indicated	Actual
Pt. 0	0	0	0
Pt. 1	499	10	10
Pt. 2	706	15	15
Pt. 3	922	20	20
Pt. 4	1150	25	25
Pt. 5	1328	30	30
Pt. 6	1521	35	35
Pt. 7	1725	40	40
Pt. 8	1982	45	45



Hi-Q Samplers

Network: Powertech Dewey-Burdock

Date: 11/19/12

Sampler ID: AMS-02

Calibrated By: S Johnston, J Andrews

Time: 16:31

Filter ID: 215,535

Set Flow: 36 cfm

Calibration

	Sensor output	Indicated	Actual
Pt. 1	836	15	15
Pt. 2	1381	25	25
Pt. 3	1815	35	35
Pt. 4	2042	40	40
Pt. 5	2291	45	45

Comments: S/N 16884

Hi-Q Sampler Calibration Record			
Project: Dewey-Burdock			
Date: 12/5/2012			
Sampler ID: AMS-03 (S/N 16886)			
Calibrated By: L. Scheinost			
Time: 1543			
Set Flow: 34.0			
Calibration			
	Sensor Output	Indicated	Actual
Pt. 0	0	0	0
Pt. 1	534	10	10
Pt. 2	791	15	15
Pt. 3	1028	20	20
Pt. 4	1277	25	25
Pt. 5	1481	30	30
Pt. 6	1683	35	35
Pt. 7	1892	40	40
Pt. 8	2075	44	44

Hi-Q Sampler Calibration Record			
Project: Dewey-Burdock			
Date: 12/3/2012			
Sampler ID: AMS-04 (S/N 16891)			
Calibrated By: L. Scheinost			
Time: 0920			
Set Flow: 36.0			
Calibration			
	Sensor Output	Indicated	Actual
Pt. 0	0	0	0
Pt. 1	465	10	10
Pt. 2	721	15	15
Pt. 3	908	19	19
Pt. 4	997	21	21
Pt. 5	1096	23	23
Pt. 6	1200	25	25
Pt. 7	1277	27	27
Pt. 8	1356	29	29
Pt. 9	1445	31	31
Pt. 10	1524	33	33
Pt. 11	1609	35	35
Pt. 12	1683	37	37
Pt. 13	1770	39	39
Pt. 14	1868	41	41
Pt. 15	1964	43	43

Hi-Q Sampler Calibration Record			
Project: Dewey-Burdock			
Date: 12/5/2012			
Sampler ID: AMS-08 (S/N 16885)			
Calibrated By: L. Scheinost			
Time: 1329			
Set Flow: 34.3			
Calibration			
	Sensor Output	Indicated	Actual
Pt. 0	0	0	0
Pt. 1	1578	10	10
Pt. 2	1941	15	15
Pt. 3	2364	20	20
Pt. 4	2885	25	25
Pt. 5	3272	30	30
Pt. 6	3672	35	35
Pt. 7	4060	40	40
Pt. 8	4246	42	42

INSTRUMENT CALIBRATION CERTIFICATION

It is certified that this instrument, identified herein has been calibrated using standards whose calibration is traceable to the U.S. National Institute of Standards and Technology.

Item: CF-5624-WR
Serial Number: 22984
Calibrated For: INTER-MOUNTAIN LABORATORIES INC
555 ABRASKA STREET
SHERIDAN, WY 82801
Purchase Order: KRISTY

Certification against Meriam Laminar Flow Element (LFE) model number Z50MW20-1½, Serial Number 1036000074. The LFE used to calibrate the item above has been calibrated and correlated at several points of flow rate per the calibration system requirements of ANSI Z540-1 and is traceable to the National Institute of Standards and Technology. The total RSS uncertainty of the working master LFE is +/- 0.72% of the reading.

The NIST Traceability tests used for working Master are:	253699, 820312HJ, 822/MET54;MET55;MET56;MET57 731/243669, 732/246837, 731/245367, 731/242697 822/250904, 252897
--	--

The Merium LFE is calibrated with air at atmospheric conditions and referenced to 29.92" Hg (760mm Hg) absolute, at 70 °F (21.1 °C). Each completed element is calibrated and correlated to read within +/- 5% of the Merium Flow standards.

Date Unit Calibrated:	9/21/12	
Barometric Pressure (actual):	29.54	" Hg
Temperature (actual):	82	°F
Relative Humidity (actual):	62	%
Calibration Filter Media:	FPAE - 102	Filter media used in calibration
Calibration Flow Range:	0.50 – 4.50 CFM	
Air Flow Leak Check:	N/A	Indicated Flow / Vacuum In. HG

Certification Information:

This unit has been calibrated against the above listed primary element. The markings are made directly on the meter face. The readings therefore are direct readings for this individual unit at the temperature, relative humidity, and barometric pressure indicated at the time of calibration.

For absolute readings, a correction factor must be applied to the apparent reading, using the actual barometric pressure, and actual temperature of the ambient air being measured.

Certified By: _____

Ngang

Calibration Department Date: _____

09/21/12

Verified By: _____

Scott A. C...

QA Supervisor

Date: _____

9/21/12

INSTRUMENT RE- CALIBRATION CERTIFICATION

It is certified that this instrument, identified herein has been calibrated using standards whose' calibration is traceable to the U.S. National Institute of Standards and Technology.

Item: CF-5624-WR
Serial Number: 22984
Calibrated For: POWERTECH USA
310 2ND AVENUE
EDGEMONT, SD 57735
Purchase Order: VISA

Certification against Meriam Laminar Flow Element (LFE) model number Z50MW20-1½, Serial Number 1036000074. The LFE used to calibrate the item above has been calibrated and correlated at several points of flow rate per the calibration system requirements of ANSI Z540-1 and is traceable to the National Institute of Standards and Technology. The total RSS uncertainty of the working master LFE is +/- 0.72% of the reading.

The NIST Traceability tests used for working Master are:	253699, 820312HJ, 822/MET54;MET55;MET56;MET57 731/243669, 732/246837, 731/245367, 731/242697 822/250904, 252897
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The Merium LFE is calibrated with air at atmospheric conditions and referenced to 29.92" Hg (760mm Hg) absolute, at 70 °F (21.1 C). Each completed element is calibrated and correlated to read within +/- 5% of the Merium Flow standards.

Date Unit Calibrated:	12/16/13	
Barometric Pressure (actual):	29.70	" Hg
Temperature (actual):	62	°F
Relative Humidity (actual):	33	%
Calibration Filter Media):	FPAE – 102	Filter media used in calibration
Calibration Flow Range:	0.50 – 4.50 CFM	
Air Flow Leak Check:	N/A	Indicated Flow / Vacuum In. HG

Certification Information:

This unit has been calibrated against the above listed primary element. The markings are made directly on the meter face. The readings therefore are direct readings for this individual unit at the temperature, relative humidity, and barometric pressure indicated at the time of calibration.

For absolute readings, a correction factor must be applied to the apparent reading, using the actual barometric pressure, and actual temperature of the ambient air being measured.

Certified By: _____ Delivered to Powertech via Email Calibration Department Date: 12/16/2013

Verified By: _____ Delivered to Powertech via Email QA Supervisor Date: 12/16/2013

CALIBRATION DATA POINTS

Company:	POWERTECH USA		
P.O. Number:	VISA	Calibration Date:	12/16/13
Unit Type:	CF-5624-WR	Barometric Pressure:	29.70 " Hg
Range:	0.50 – 4.50 CFM	Temperature:	62 ° F
Serial Number:	22984	Relative Humidity:	33 %

Point	Flow Rate (cfm)	A/D
1	0.00	3696
2	0.00	3696
3	0.00	3696
4	0.00	3696
5	0.00	3696
6	0.00	3696
7	0.50	3835
8	1.00	4003
9	1.50	4225
10	2.00	4499
11	2.50	4907
12	3.00	5224
13	3.50	5865
14	4.00	6456
15	4.50	6776



Hi-Q Samplers

Network: Powertech Dewey-Burdock

Date: 11/20/2012

Sampler ID: AMS-BKG

Calibrated By: S Johnston, J Andrews

Time: 15:05

Filter ID: 215,538

Set Flow: 36 cfm

Calibration

	Sensor output	Indicated	Actual
Pt. 1	850	15	15
Pt. 2	1404	25	25
Pt. 3	1855	35	35
Pt. 4	2071	40	40
Pt. 5	2329	45	45

Comments:

S/N 16890

INSTRUMENT CALIBRATION CERTIFICATION

It is certified that this instrument, identified herein has been calibrated using standards whose calibration is traceable to the U.S. National Institute of Standards and Technology.

Item: HFC – 50C
Serial Number: 23123
Calibrated For: INTER-MOUNTAIN LABORATORIES INC
555 ABRASKA STREET
SHERIDAN, WY 82801
Purchase Order: 240582

Calibration against Meriam Laminar Flow Element (LFE) model number Z50MC2-2, Serial Number 1036000073. The LFE used to calibrate the item above has been calibrated and correlated at several points of flow rate per the calibration system requirements of ANSI Z540-1 and is traceable to the National Institute of Standards and Technology. The total RSS uncertainty of the working master LFE is +/- 0.54% of the reading.

The NIST Traceability tests used for working Master are:	253699, 820312HJ, 822/MET54;MET55;MET56;MET57 731/243669, 732/246837, 731/245367, 731/242697 822/250904, 252897
--	--

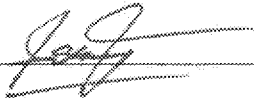
The Merium LFE is calibrated with air at atmospheric conditions and referenced to 29.92" Hg (760mm Hg) absolute, at 70 °F (Corrected to 70°F) (21.1 C). Each completed element is calibrated and correlated to read within +/- 5% of the Merium Flow standards.

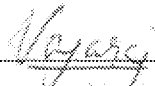
Date Unit Calibrated:	11/8/12	
Barometric Pressure (actual):	29.58	
Temperature(actual)::	75	°F
Relative Humidity (actual):	55	%
Calibration Filter Media:	OPEN AIR	Filter media used in calibration
Calibration Flow Range:	10 – 50 CFM	
Air Flow Leak Check :	N/A	Indicated Flow / Vacuum In. HG

Certification Information:

This unit has been calibrated against the above listed primary element. The markings are made directly on the meter face. The readings therefore are direct readings for this individual unit at the temperature, relative humidity, and barometric pressure indicated at the time of calibration.

For absolute readings, a correction factor must be applied to the apparent reading, using the actual barometric pressure, and actual temperature of the ambient air being measured.

Certified By:  /Calibration Department Date: 11/8/12

Verified By:  /QA Supervisor Date: 11/8/12

Appendix C

Quarterly Meteorological Data

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Dewey-Burdock 1Q13

Meteorological Data Summary

1/1/2013 - 3/31/2013

Hourly Data

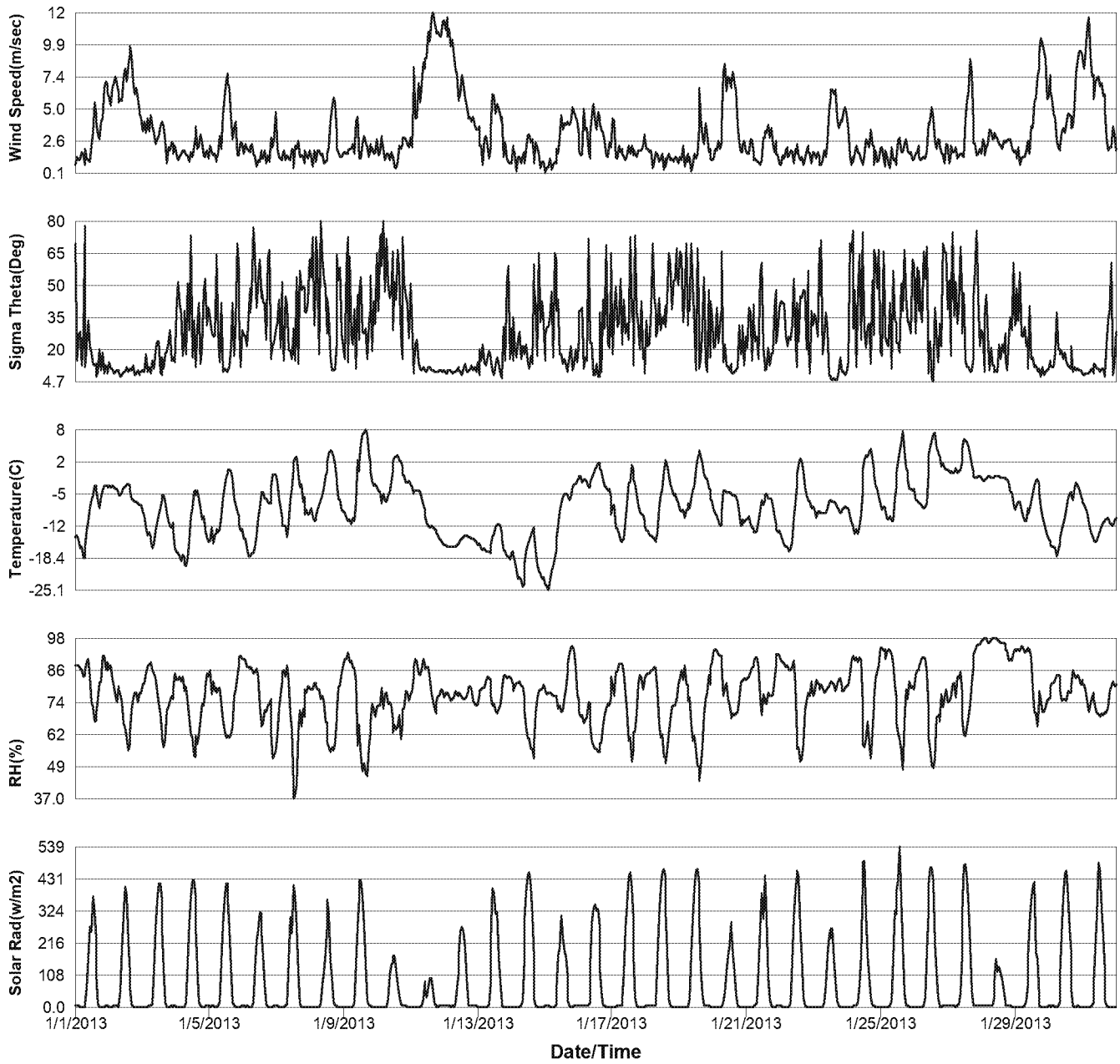
	Average/Total	Max	Min
Wind Speed (m/sec)	3.8	16.6	0.1
Sigma-Theta (°)	24.4	79.8	4.3
Temperature (C)	-3.1	20.9	-25.1
Relative Humidity (%)	67.6	98.4	12.7
Precipitation (in)	0.00	0.00	
Bar. Pressure (in Hg)	26.5	26.9	26.0
Solar Radiation (w/m^2)	130.4	798.2	

Predominant wind direction was from the NW sector,
accounting for 25.2% of the possible winds

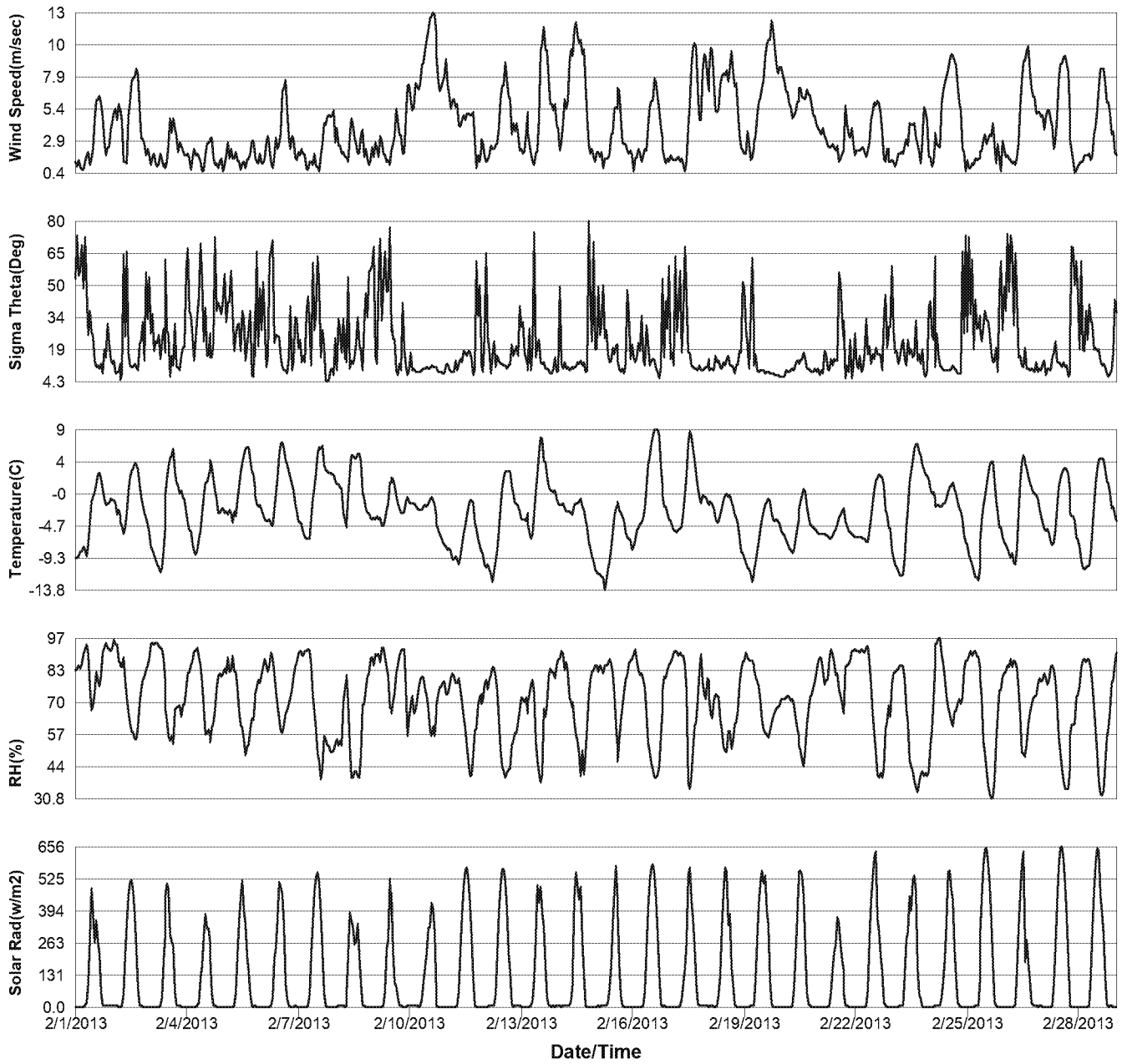
Data Recovery

Parameter	Possible (hours)	Reported (hours)	Recovery
Wind Speed	2160	2160	100.00%
Wind Direction	2160	2160	100.00%
Sigma-Theta	2160	2160	100.00%
Temperature	2160	2160	100.00%
Relative Humidity	2160	2160	100.00%
Precipitation	2160	2160	100.00%
Bar. Pressure	2160	2160	100.00%
Solar Radiation	2160	2160	100.00%

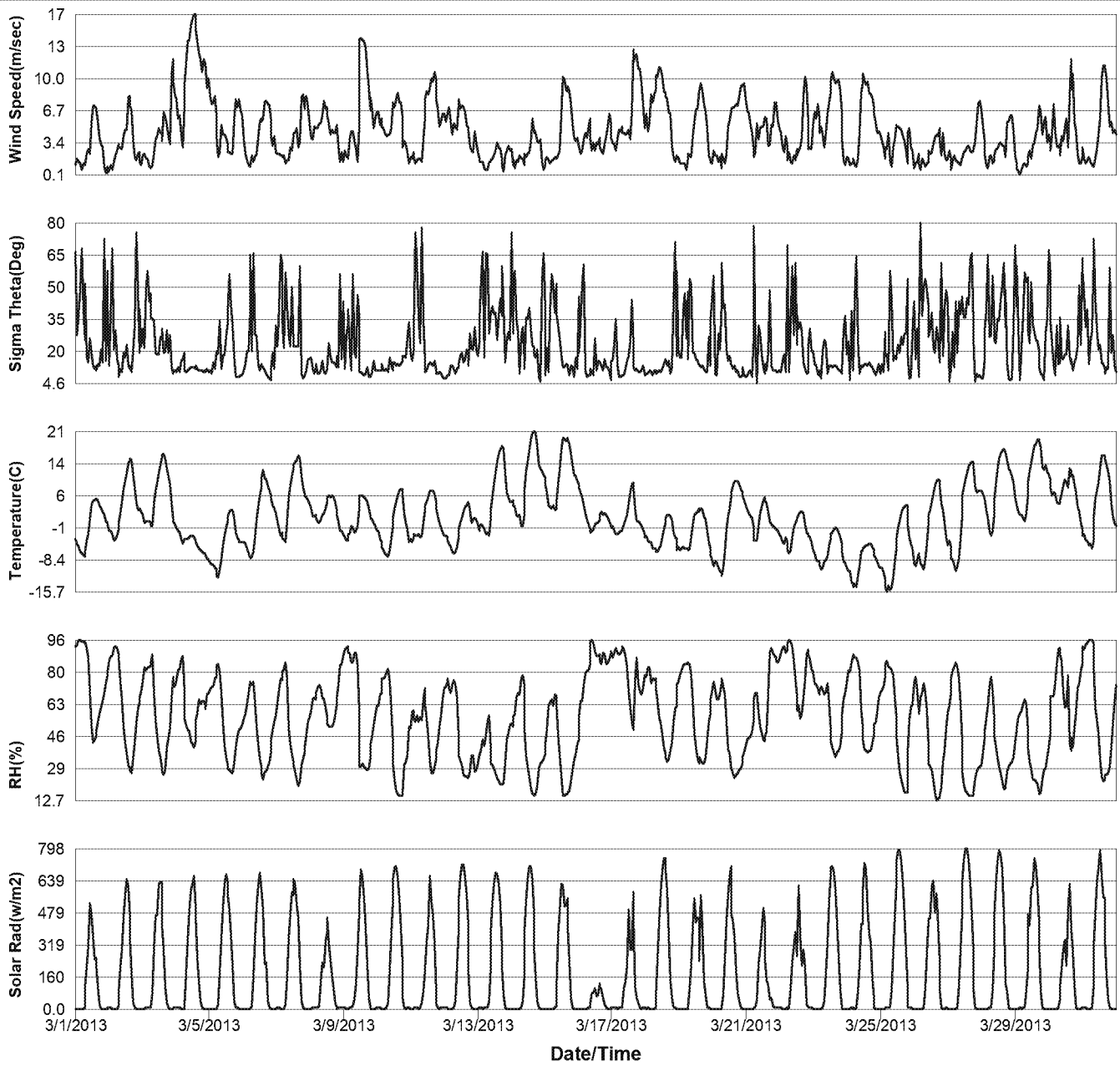
Dewey-Burdock Meteorological Parameters



Dewey-Burdock Meteorological Parameters

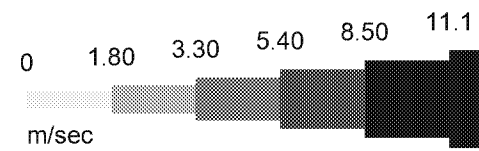


Dewey-Burdock Meteorological Parameters



Edgemont, SD
1/15/2013 Hr. 7 to 3/31/2013 Hr. 24

Edgemont, SD
1/15/2013 Hr. 7 to 3/31/2013 Hr. 24



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Dewey-Burdock Met Station

2Q13

Meteorological Data Summary

4/1/2013 - 6/30/2013

Hourly Data

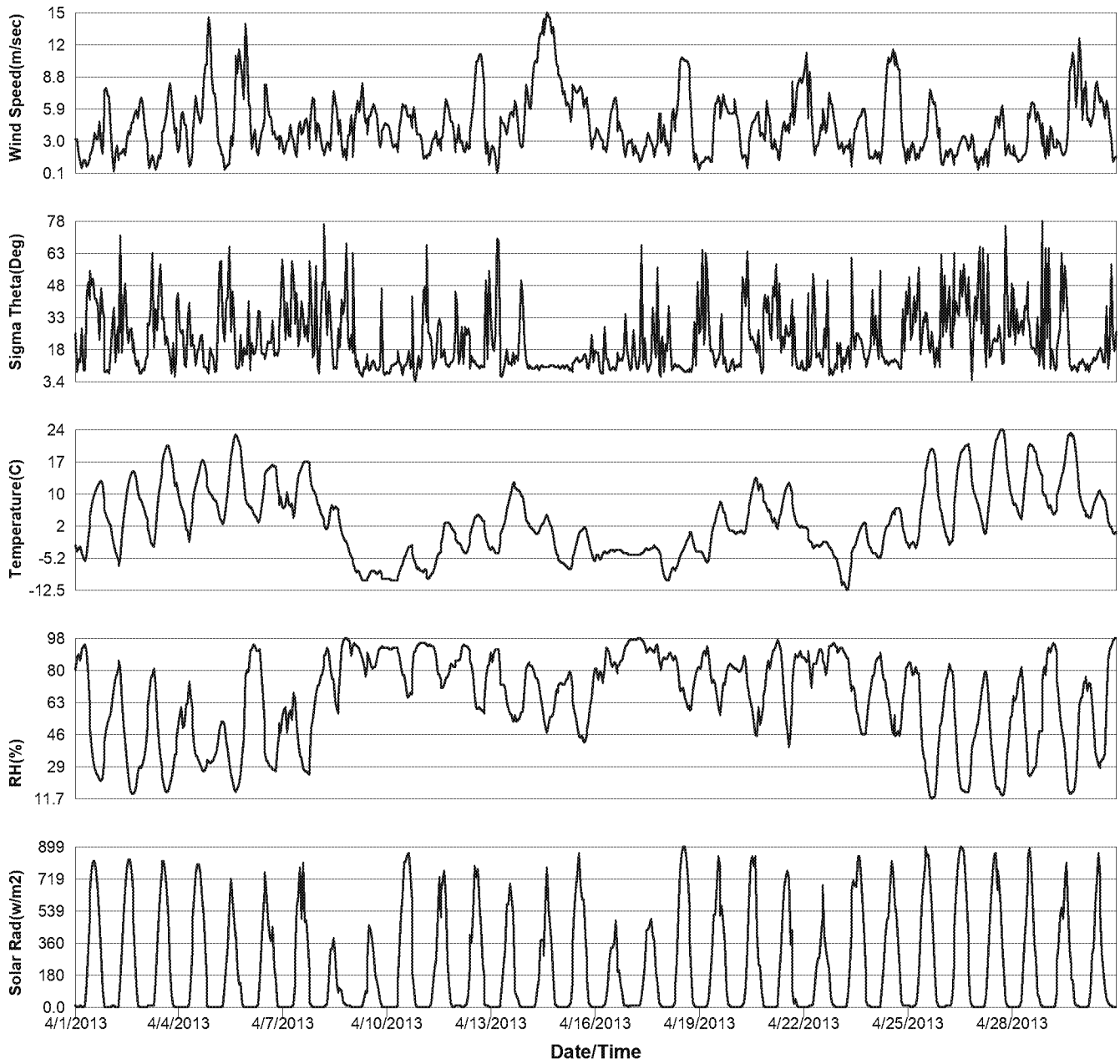
	Average/Total	Max	Min
Wind Speed (m/sec)	4.7	14.6	0.1
Sigma-Theta (°)	23.4	79.4	3.4
Temperature (C)	12.0	33.1	-12.5
Relative Humidity (%)	58.5	97.6	9.2
Precipitation (in)	1.80	0.30	
Bar. Pressure (in Hg)	26.5	27.1	26.0
Solar Radiation (w/m^2)	257.2	946.0	

Predominant wind direction was from the NW sector,
accounting for 16.2% of the possible winds

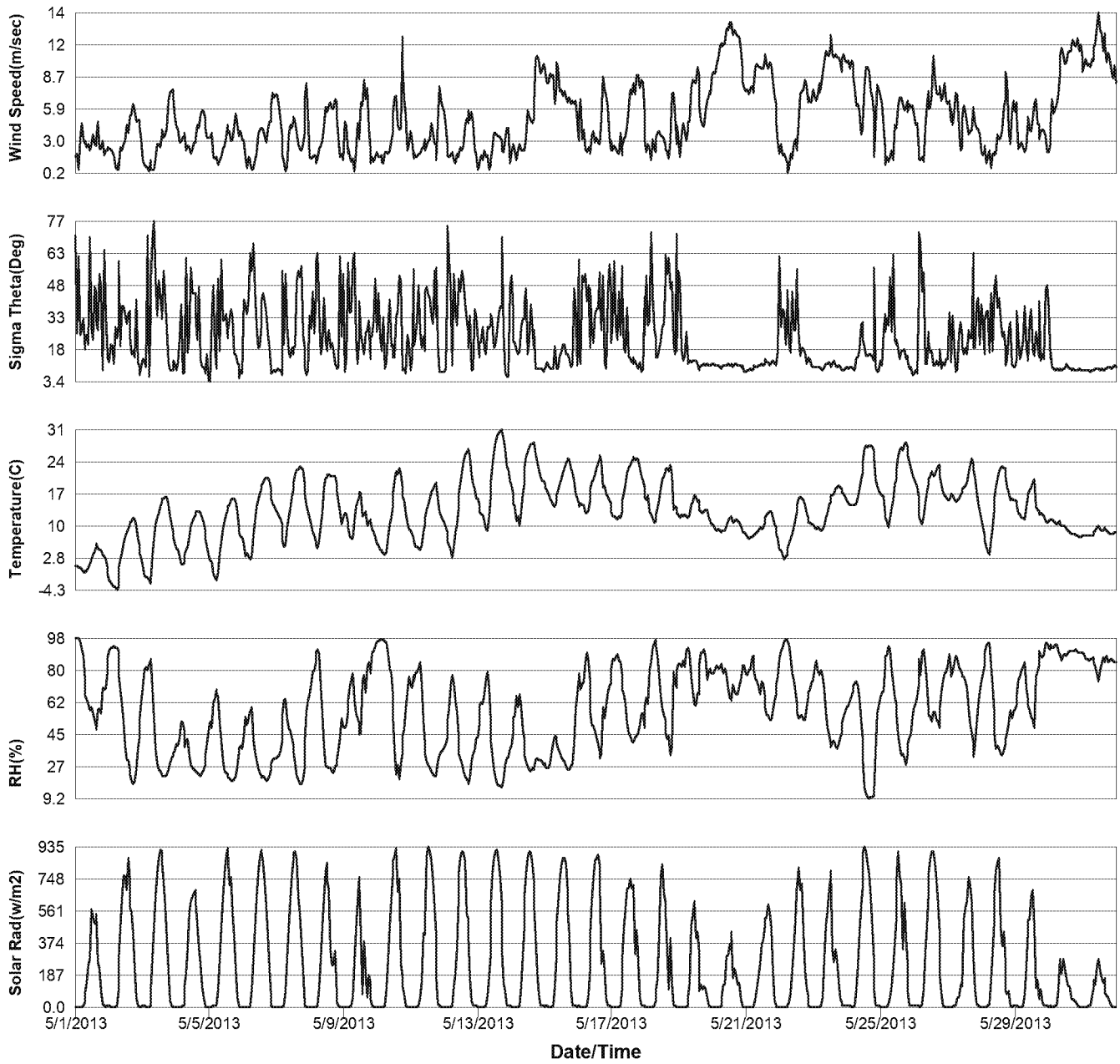
Data Recovery

Parameter	Possible (hours)	Reported (hours)	Recovery
Wind Speed	2184	2184	100.00%
Wind Direction	2184	2184	100.00%
Sigma-Theta	2184	2184	100.00%
Temperature	2184	2184	100.00%
Relative Humidity	2184	2184	100.00%
Precipitation	2184	2184	100.00%
Bar. Pressure	2184	2184	100.00%
Solar Radiation	2184	2184	100.00%

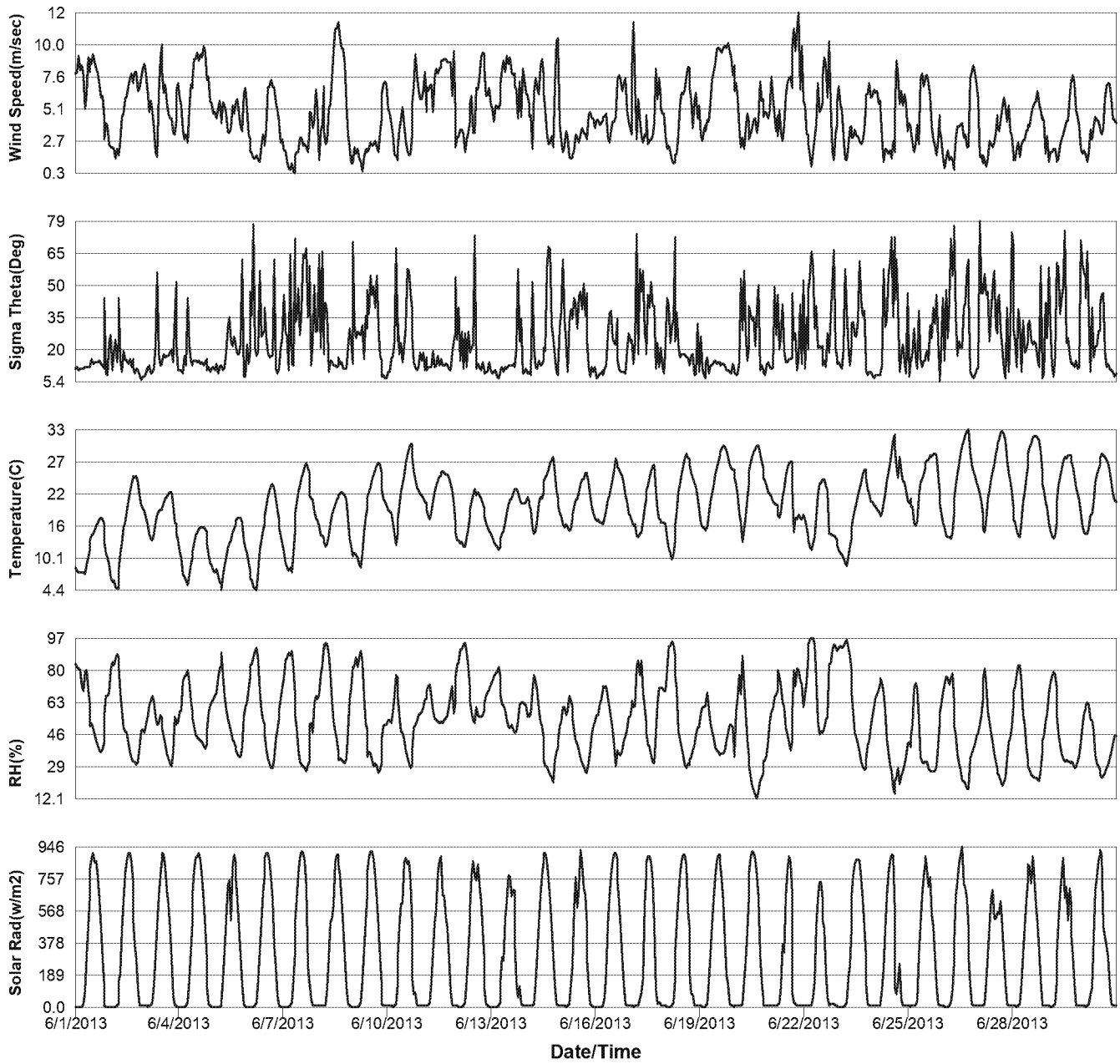
Dewey-Burdock Meteorological Parameters



Dewey-Burdock Meteorological Parameters



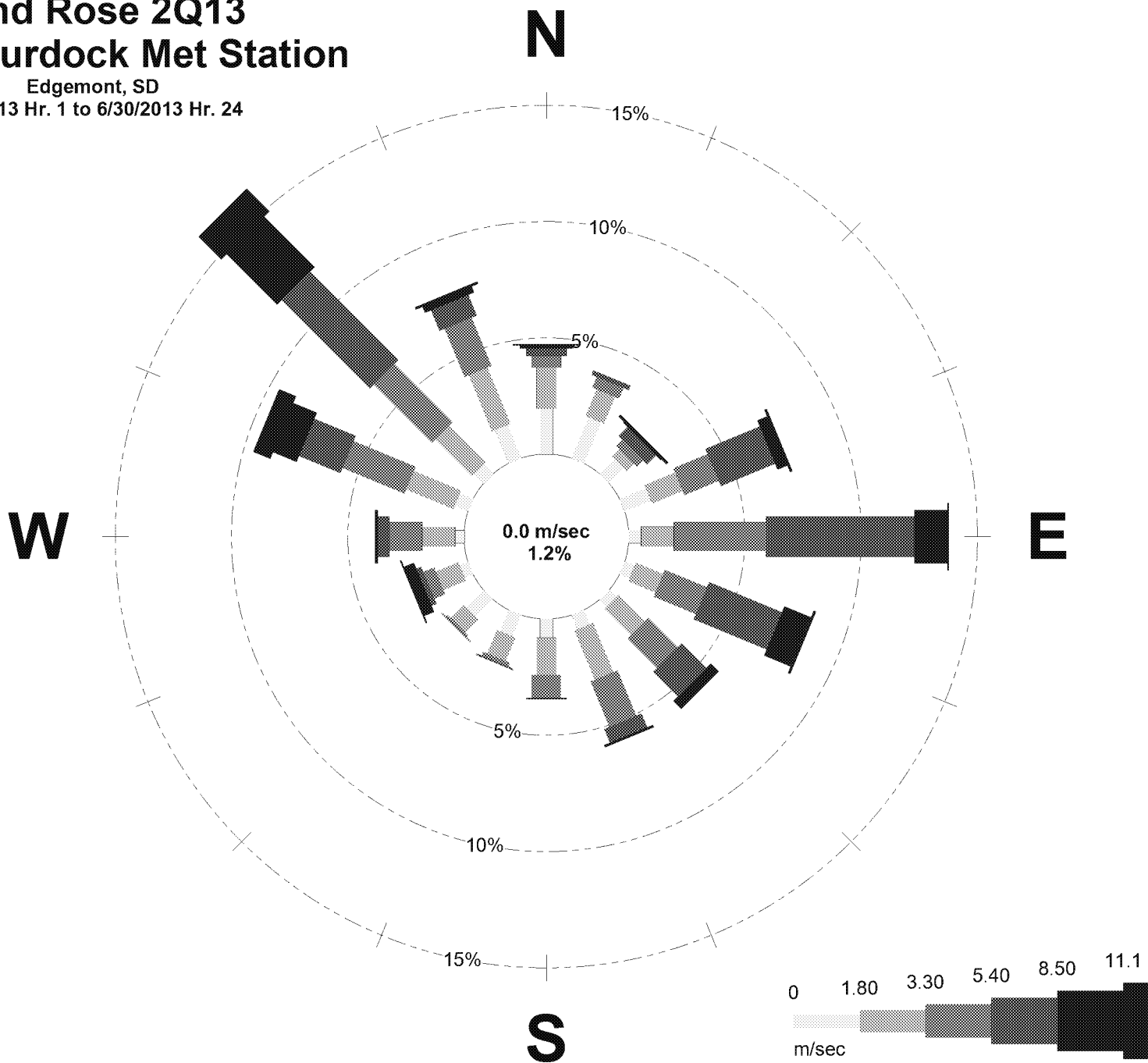
Dewey-Burdock Meteorological Parameters



Wind Rose 2Q13

Dewey-Burdock Met Station

Edgemont, SD
4/1/2013 Hr. 1 to 6/30/2013 Hr. 24



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Dewey-Burdock 3rd Qtr 2013

Meteorological Data Summary

7/1/2013 - 9/30/2013

Hourly Data

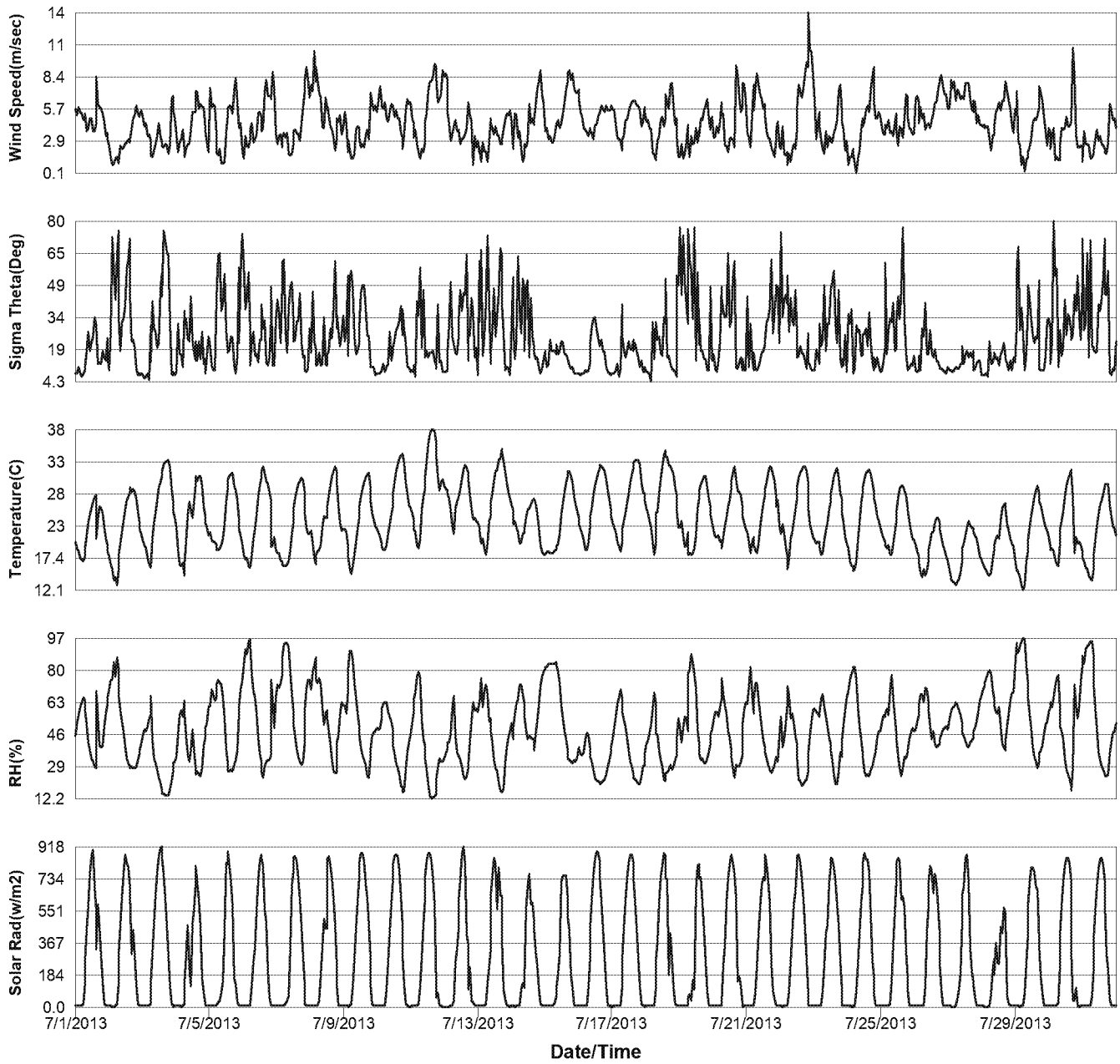
	Average/Total	Max	Min
Wind Speed (m/sec)	4.0	15.1	0.0
Sigma-Theta (°)	25.8	79.6	0.0
Temperature (C)	21.6	38.5	-1.3
Relative Humidity (%)	53.3	100.0	10.8
Precipitation (in)	2.90	0.90	
Bar. Pressure (in Hg)	26.6	26.9	26.1
Solar Radiation (w/m^2)	233.5	918.0	

Predominant wind direction was from the E sector,
accounting for 17.1% of the possible winds

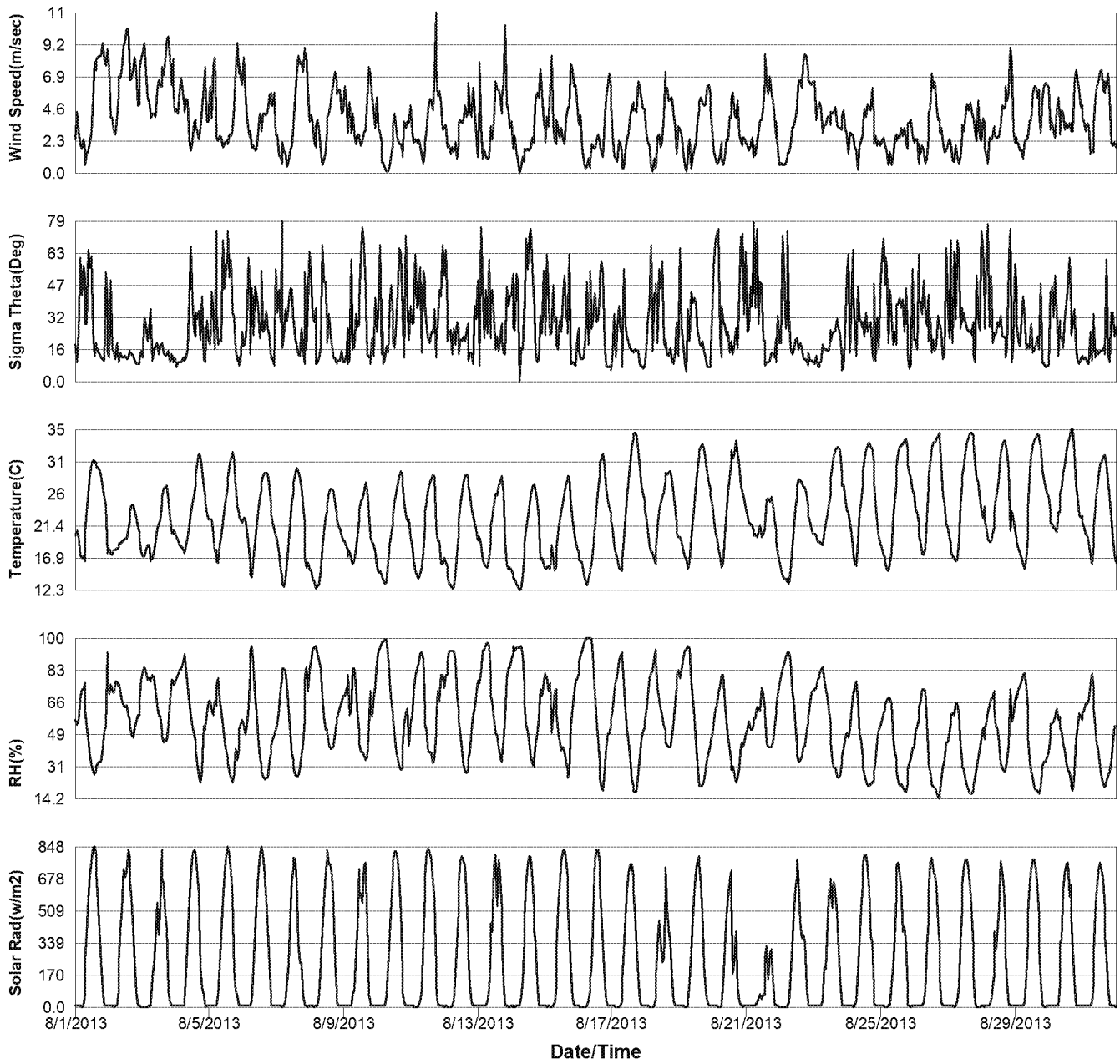
Data Recovery

Parameter	Possible (hours)	Reported (hours)	Recovery
Wind Speed	2208	2207	99.95%
Wind Direction	2208	2207	99.95%
Sigma-Theta	2208	2207	99.95%
Temperature	2208	2207	99.95%
Relative Humidity	2208	2207	99.95%
Precipitation	2208	2207	99.95%
Bar. Pressure	2208	2207	99.95%
Solar Radiation	2208	2207	99.95%

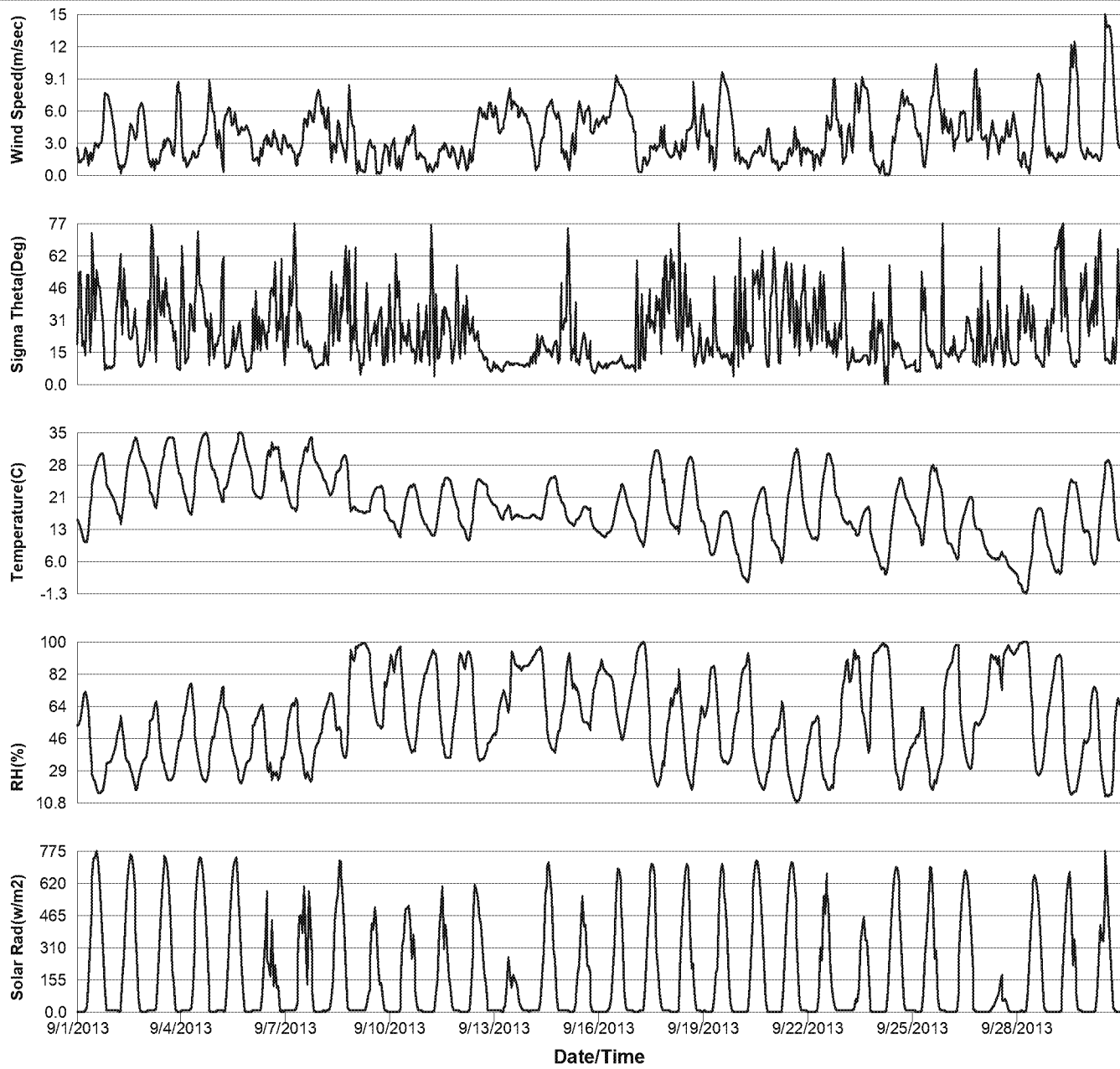
Dewey-Burdock Meteorological Parameters



Dewey-Burdock Meteorological Parameters

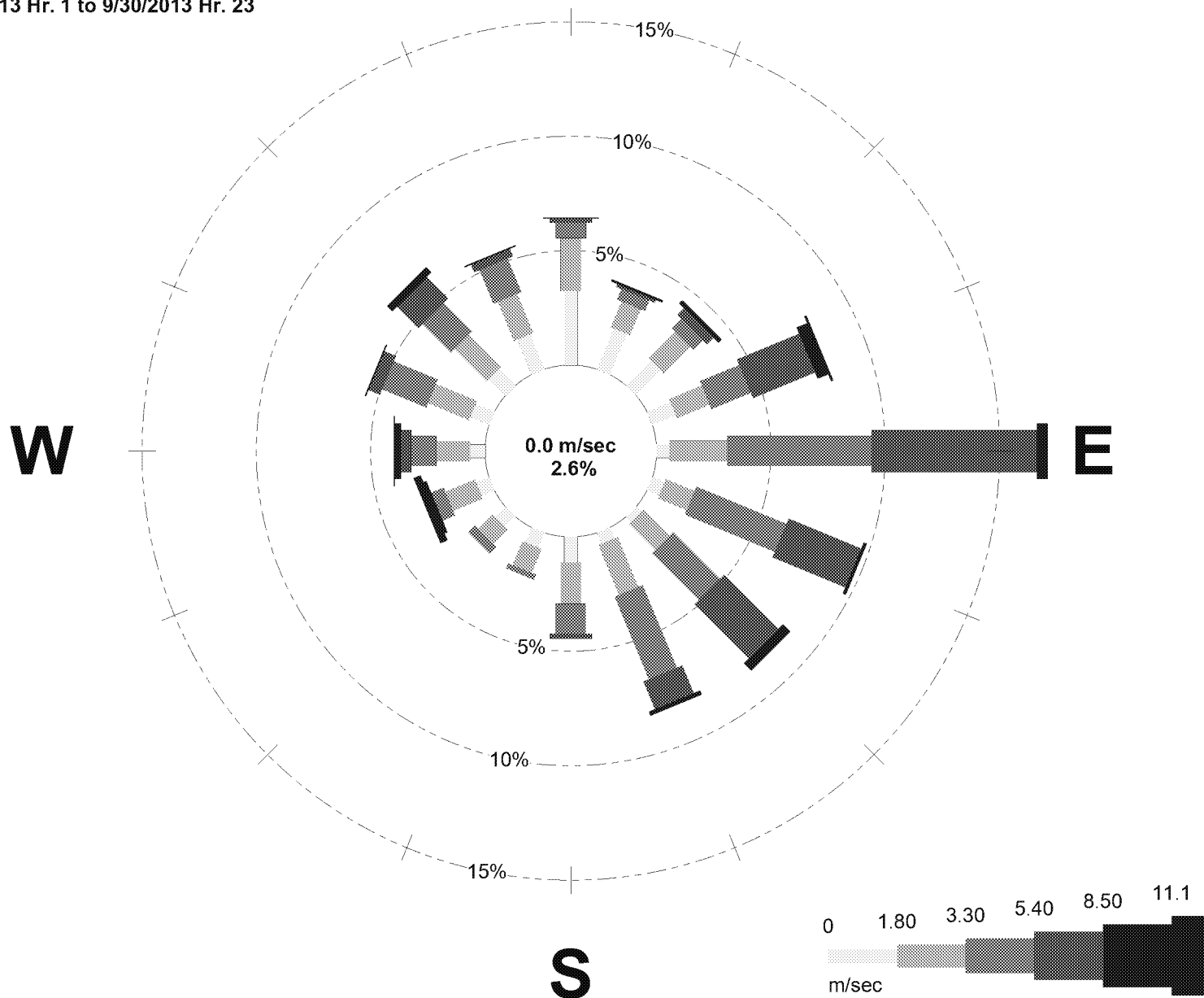


Dewey-Burdock Meteorological Parameters



Wind Rose 3Q13 Dewey-Burdock Met Station

Edgemont, SD
7/1/2013 Hr. 1 to 9/30/2013 Hr. 23



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Dewey-Burdock 4th Qtr 2013

Meteorological Data Summary

10/1/2013 - 12/31/2013

Hourly Data

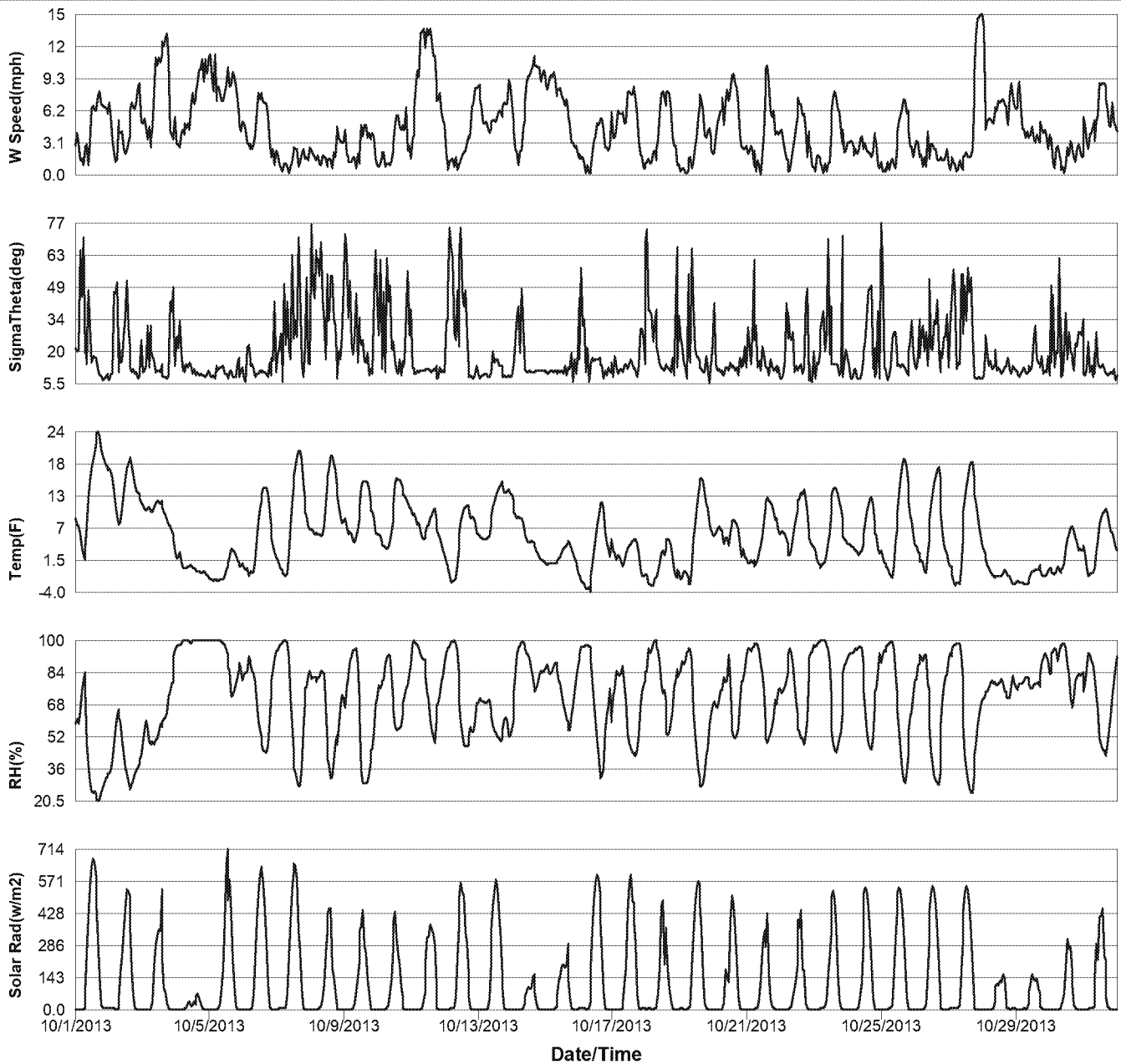
	Average/Total	Max	Min
Wind Speed (m/sec)	3.5	15.4	0.0
Sigma-Theta (°)	22.8	77.7	0.0
Temperature (C)	-1.0	23.6	-26.8
Relative Humidity (%)	71.0	100.0	19.9
Precipitation (in)	1.80	0.30	
Bar. Pressure (in Hg)	26.5	26.9	26.0
Solar Radiation (w/m^2)	91.3	714.1	

Predominant wind direction was from the NW sector,
accounting for 21.2% of the possible winds

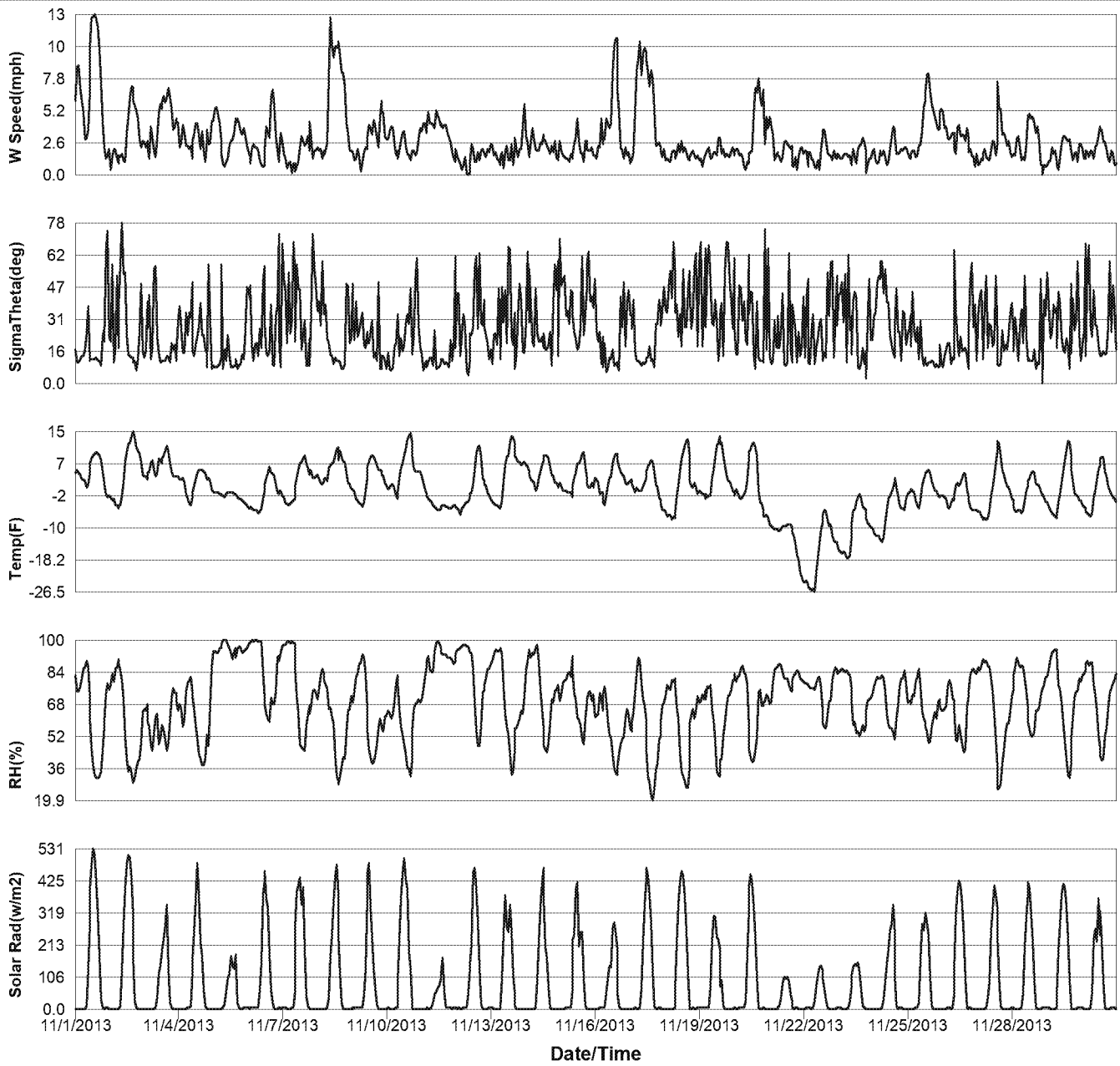
Data Recovery

Parameter	Possible (hours)	Reported (hours)	Recovery
Wind Speed	2208	2183	98.87%
Wind Direction	2208	2183	98.87%
Sigma-Theta	2208	2183	98.87%
Temperature	2208	2183	98.87%
Relative Humidity	2208	2183	98.87%
Precipitation	2208	2183	98.87%
Bar. Pressure	2208	926	41.94%
Solar Radiation	2208	2183	98.87%

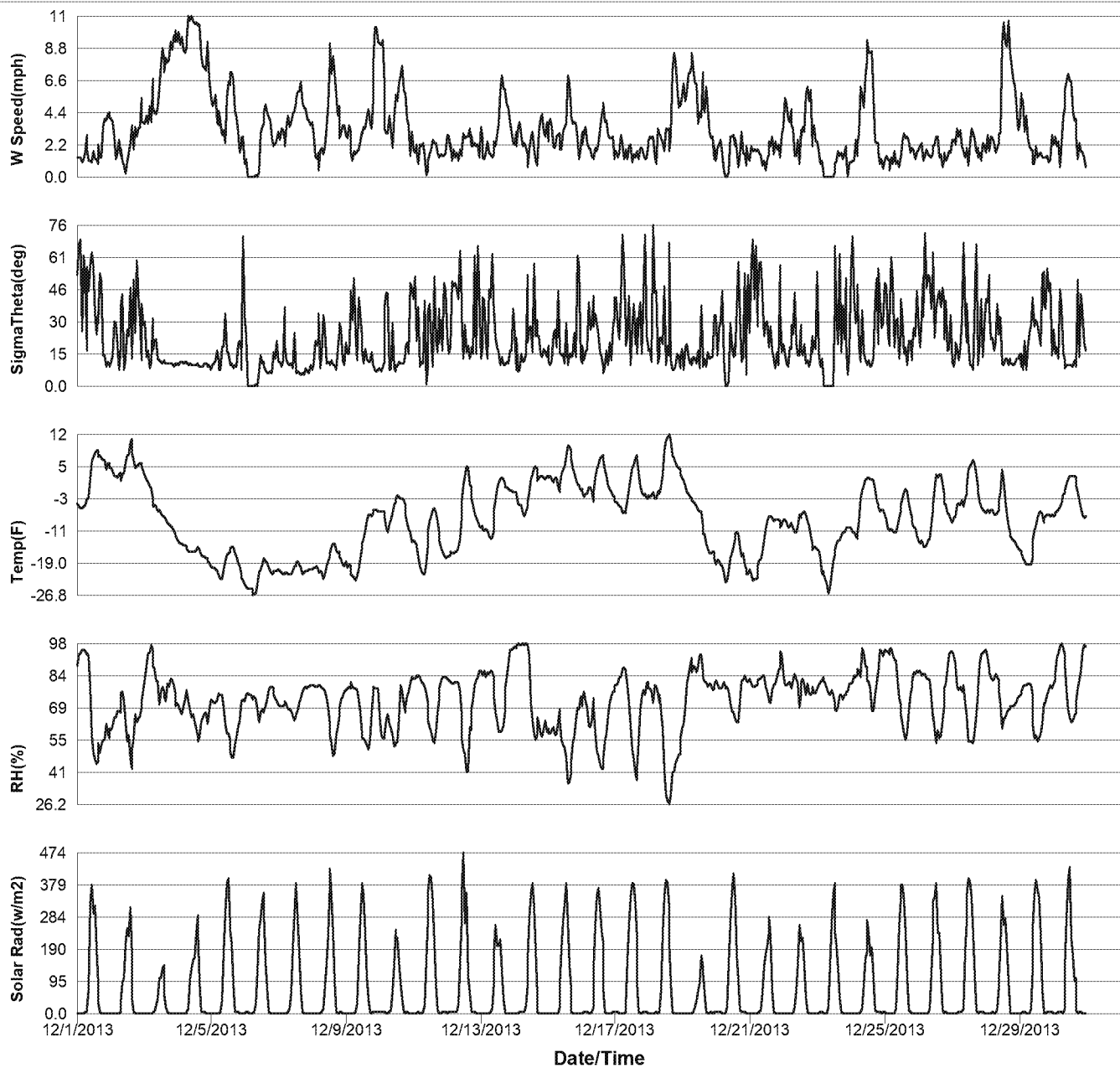
Dewey-Burdock ISR Meteorological Parameters



Dewey-Burdock ISR Meteorological Parameters

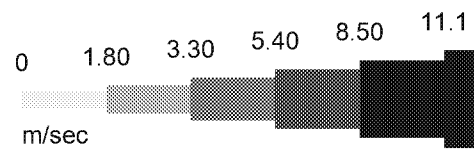


Dewey-Burdock ISR Meteorological Parameters



Edgemont, SD
10/1/2013 Hr. 1 to 12/30/2013 Hr. 23

Edgemont, SD
10/1/2013 Hr. 1 to 12/30/2013 Hr. 23



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Dewey-Burdock 2013 YTD

Meteorological Data Summary

1/1/2013 - 12/31/2013

Hourly Data

	Average/Total	Max	Min
Wind Speed (m/sec)	4.0	16.6	0.0
Sigma-Theta (°)	24.1	79.8	0.0
Temperature (C)	7.4	38.5	-26.8
Relative Humidity (%)	62.6	100.0	9.2
Precipitation (in)	6.50	0.90	
Bar. Pressure (in Hg)	26.5	27.1	26.0
Solar Radiation (w/m^2)	178.3	946.0	

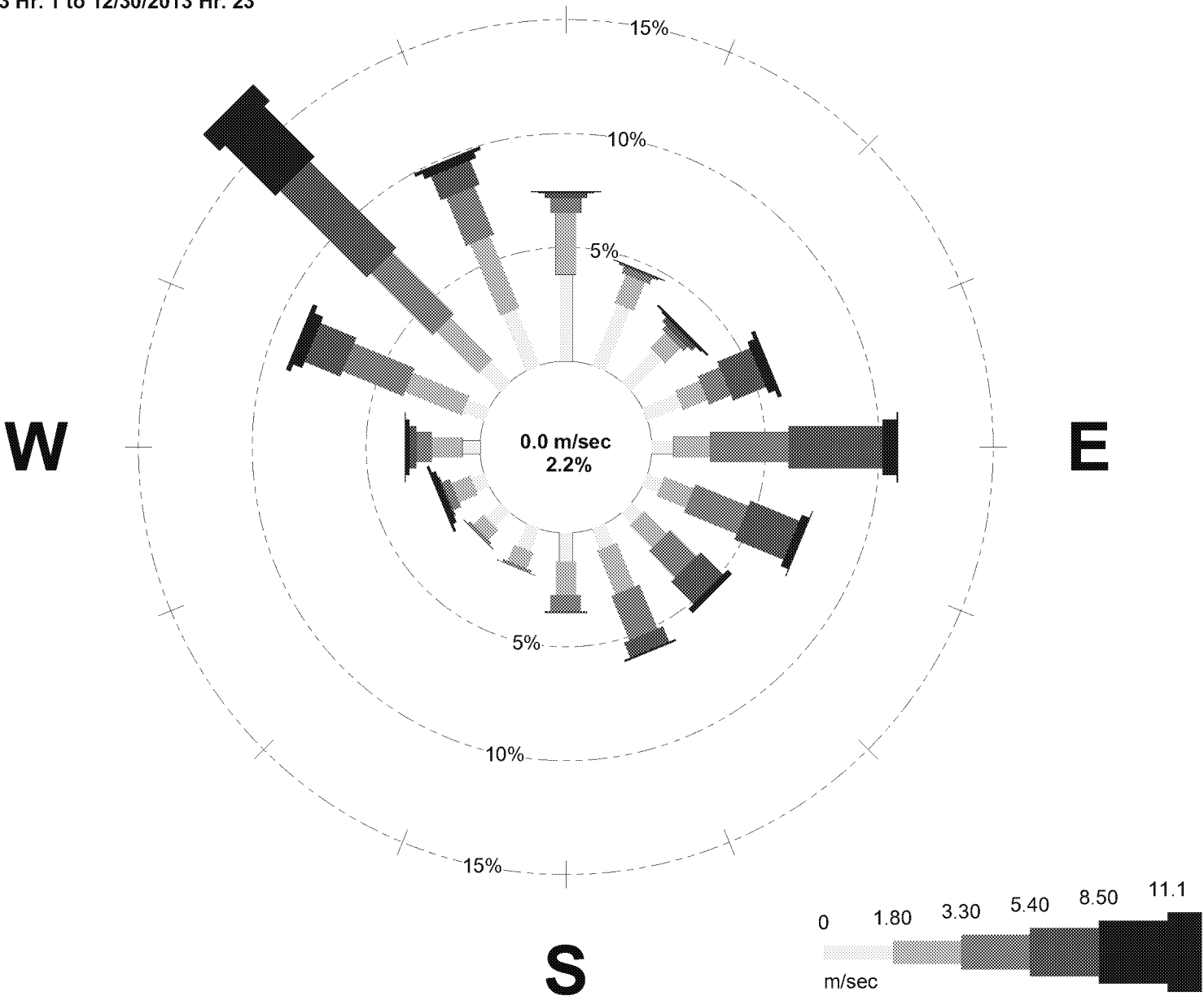
Predominant wind direction was from the NW sector,
accounting for 17.2% of the possible winds

Data Recovery

Parameter	Possible (hours)	Reported (hours)	Recovery
Wind Speed	8760	8735	99.71%
Wind Direction	8760	8735	99.71%
Sigma-Theta	8760	8735	99.71%
Temperature	8760	8735	99.71%
Relative Humidity	8760	8735	99.71%
Precipitation	8760	8735	99.71%
Bar. Pressure	8760	7478	85.37%
Solar Radiation	8760	8735	99.71%

Wind Rose 2013 YTD Dewey-Burdock Met Station

Edgemont, SD
1/1/2013 Hr. 1 to 12/30/2013 Hr. 23



Appendix D

Inter-Mountain Labs
Reports for Air Particulate Samples

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Inter-Mountain Labs

Sheridan, WY and Gillette, WY

- CHAIN OF CUSTODY RECORD -

Page 1 of 1

All shaded fields must be completed.

This is a legal document; any misrepresentation may be construed as fraud.

#WEB

Client Name Powertech (USA) Inc.		Project Identification Dewey-Burdock Project		Sampler (Signature/Attestation of Authenticity)		Telephone # 605-662-8308														
Report Address P.O. Box 812 Edgemont, SD 57735		Contact Name Lisa Scheinost		Email escheinost@powertechuranium.com		Phone 605-662-8308														
Invoice Address P.O. Box 812 Edgemont, SD 57735		Purchase Order # 149		Quote # PT1208081		ANALYSES / PARAMETERS														
						REMARKS														
ITEM	LAB ID (Lab Use Only)	DATE SAMPLED	TIME	SAMPLE IDENTIFICATION	Matrix	# of Containers	U Nat.	Th230	Ra226	Pb210										
1	SD0119-001	1/4/13 to 3/28/13		AMS-BKG-Q1	FT	1 w/ 12	X	X	X	X										pls composite filters
2	002	1/4/13 to 3/28/13		AMS-08-Q1	FT	1 w/ 12	X	X	X	X										pls composite filters
3	003	1/4/13 to 3/28/13		AMS-09-Q1	FT	1 w/ 12	X	X	X	X										pls composite filters
4																				
5																				
6																				The following are
7																				NRC required LLDs:
8																				U Nat. 5.89E-01 pCi
9																				Th230 5.89E-01 pCi
10																				Ra226 5.89E-01 pCi
11																				Pb210 1.18E+01 pCi
12																				It is very important to
13																				meet the LLDs.
14																				Please call Lisa with
																				questions 6056628308.
LAB COMMENTS		Relinquished By (Signature/Printed)				DATE	TIME	Received By (Signature/Printed)				DATE	TIME							
		<i>Lisa Scheinost</i> / Lisa Scheinost				4/4/13	0845	<i>William Zinner</i>				4/4/13	1530							
SHIPPING INFO		MATRIX CODES		TURN AROUND TIMES		COMPLIANCE INFORMATION				ADDITIONAL REMARKS										
<input checked="" type="checkbox"/> UPS		Water	WT	Check desired service		Compliance Monitoring ?				N										
<input type="checkbox"/> FedEx		Soil	SL	<input checked="" type="checkbox"/> Standard turnaround		Program (SDWA, NPDES,...)				Please note LLDS above. Thank you.										
<input type="checkbox"/> USPS		Solid	SD	<input type="checkbox"/> RUSH - 5 Working Days		PWSID / Permit #														
<input type="checkbox"/> Hand Carried		Filter	FT	<input type="checkbox"/> URGENT - < 2 Working Days		Chlorinated?				N										
<input type="checkbox"/> Other		Other	OT	Rush & Urgent Surcharges will be applied		Sample Disposal: Lab X Client														

<u>Year</u>	<u>Quarter</u>	<u>Site</u>	<u>Standard Liters</u>	<u>Temp (F)</u>	<u>Pressure (" Hg)</u>	<u>Actual Liters</u>
2013	1	AMS_08	114,571,573	26.4	26.50	117,173,588
2013	1	AMS_09	6,755,373	26.4	26.50	6,908,793
2013	1	AMS_BKG	108,830,800	26.4	26.50	111,302,437



Inter-Mountain Labs

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

Date: 5/17/2013

CLIENT: Powertech Uranium USA Inc.
Project: Dewey-Burdock Project
Lab Order: S1304119

CASE NARRATIVE
Report ID: S1304119001

Samples AMS-08-Q1, AMS-09-Q1, and AMS-BKG-Q1 were received on April 4, 2013.

All samples were received and analyzed within the EPA recommended holding times, except those noted in this case narrative. Samples were analyzed using the methods outlined in the following references:

"Standard Methods For The Examination of Water and Wastewater", approved method versions
Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition
40 CFR Parts 136 and 141
40 CFR Part 50, Appendices B, J, L, and O
Methods indicated in the Methods Update Rule published in the Federal Register Friday, May 18, 2012
ASTM approved and recognized standards

All Quality Control parameters met the acceptance criteria defined by EPA and Inter-Mountain Laboratories except as indicated in this case narrative.

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: Powertech Uranium USA Inc.
P.O. Box 812
Edgemont, SD 57735

Date Reported 5/16/2014
Report ID S1304119006
(Replaces S1304119005)

ProjectName: Dewey-Burdock Project
Lab ID: S1304119-001
ClientSample ID: AMS-BKG-Q1
COC: Web

WorkOrder: S1304119
CollectionDate: 3/28/2013
DateReceived: 4/4/2013 3:30:00 PM
FieldSampler:
Matrix: Filter

Comments Sampled 1/4/13-3/28/13

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
Field						
Actual Volume	111302437	Liters			Field	03/28/2013 000
Radionuclides - Filter						
Lead 210	2290	pCi/Filter		80.0	OTW01	05/05/2013 1906 SH
Lead 210 Precision (±)	115	pCi/Filter			OTW01	05/05/2013 1906 SH
Lead 210	2.1E-14	µCi/mL		7.2E-16	Calculation	05/16/2014 1654 WN
Lead 210 Precision (±)	1.0E-15	µCi/mL			Calculation	05/16/2014 1654 WN
Radium 226	1.2	pCi/Filter	J	6.00	SM 7500RAB	04/30/2013 1530 SH
Radium 226 Precision (±)	1.2	pCi/Filter	J		SM 7500RAB	04/30/2013 1530 SH
Radium 226	1.1E-17	µCi/mL	J	5.4E-17	Calculation	05/16/2014 1654 WN
Radium 226 Precision (±)	1.1E-17	µCi/mL	J		Calculation	05/16/2014 1654 WN
Thorium 230	2.4	pCi/Filter	J	6.00	ACW10	05/09/2013 802 MB
Thorium-230 Precision (±)	2.4	pCi/Filter	J		ACW10	05/09/2013 802 MB
Thorium 230	2.2E-17	µCi/mL	J	5.4E-17	Calculation	05/16/2014 1654 WN
Thorium 230 Precision (±)	2.2E-17	µCi/mL	J		Calculation	05/16/2014 1654 WN
Uranium	1.20	pCi/Filter	J	6.00	EPA 200.8	04/23/2013 1440 MS
Uranium	1.1E-17	µCi/mL	J	5.4E-17	Calculation	05/16/2014 1654 WN

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers: B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
M Value exceeds Monthly Ave or MCL or is less than LCL
O Outside the Range of Dilutions
X Matrix Effect

C Calculated Value
H Holding times for preparation or analysis exceeded
L Analyzed by a contract laboratory
ND Not Detected at the Reporting Limit
S Spike Recovery outside accepted recovery limits

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager

Page 1 of 3



Sample Analysis Report

Company: Powertech Uranium USA Inc.
P.O. Box 812
Edgemont, SD 57735

Date Reported 5/16/2014
Report ID S1304119006
(Replaces S1304119005)

ProjectName: Dewey-Burdock Project
Lab ID: S1304119-002
ClientSample ID: AMS-08-Q1
COC: Web

WorkOrder: S1304119
CollectionDate: 3/28/2013
DateReceived: 4/4/2013 3:30:00 PM
FieldSampler:
Matrix: Filter

Comments Sampled 1/4/13-3/28/13

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
----------	--------	-------	------	----	--------	--------------------

Field

Actual Volume	117173588	Liters			Field	03/28/2013 000
---------------	-----------	--------	--	--	-------	----------------

Radionuclides - Filter

Lead 210	2240	pCi/Filter		80.0	OTW01	05/05/2013 1906	SH
Lead 210 Precision (±)	115	pCi/Filter			OTW01	05/05/2013 1906	SH
Lead 210	1.9E-14	µCi/mL		6.8E-16	Calculation	05/16/2014 1654	WN
Lead 210 Precision (±)	9.8E-16	µCi/mL			Calculation	05/16/2014 1654	WN
Radium 226	1.2	pCi/Filter	J	6.00	SM 7500RAB	04/30/2013 1530	SH
Radium 226 Precision (±)	1.2	pCi/Filter	J		SM 7500RAB	04/30/2013 1530	SH
Radium 226	1.0E-17	µCi/mL	J	5.1E-17	Calculation	05/16/2014 1654	WN
Radium 226 Precision (±)	1.0E-17	µCi/mL	J		Calculation	05/16/2014 1654	WN
Thorium 230	1.2	pCi/Filter	J	6.00	ACW10	05/09/2013 802	MB
Thorium-230 Precision (±)	2.4	pCi/Filter	J		ACW10	05/09/2013 802	MB
Thorium 230	1.0E-17	µCi/mL	J	5.1E-17	Calculation	05/16/2014 1654	WN
Thorium 230 Precision (±)	2.0E-17	µCi/mL	J		Calculation	05/16/2014 1654	WN
Uranium	2.40	pCi/Filter	J	6.00	EPA 200.8	04/23/2013 1450	MS
Uranium	2.0E-17	µCi/mL	J	5.1E-17	Calculation	05/16/2014 1654	WN

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager

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Sample Analysis Report

Company: Powertech Uranium USA Inc.
P.O. Box 812
Edgemont, SD 57735

ProjectName: Dewey-Burdock Project
Lab ID: S1304119-003
ClientSample ID: AMS-09-Q1
COC: Web

Date Reported 5/16/2014
Report ID S1304119006
(Replaces S1304119005)

WorkOrder: S1304119
CollectionDate: 3/28/2013
DateReceived: 4/4/2013 3:30:00 PM
FieldSampler:
Matrix: Filter

Comments Sampled 1/4/13-3/28/13

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
Field						
Actual Volume	6908793	Liters			Field	03/28/2013 000
Radionuclides - Filter						
Lead 210	29.5	pCi/Filter		2.00	OTW01	05/07/2013 1612 SH
Lead 210 Precision (±)	7.1	pCi/Filter			OTW01	05/07/2013 1612 SH
Lead 210	4.3E-15	µCi/mL		2.9E-16	Calculation	06/07/2013 1653 WN
Lead 210 Precision (±)	1.0E-15	µCi/mL			Calculation	06/07/2013 1653 WN
Radium 226	0.6	pCi/Filter		0.200	SM 7500RAB	04/30/2013 1530 SH
Radium 226 Precision (±)	0.2	pCi/Filter			SM 7500RAB	04/30/2013 1530 SH
Radium 226	8.7E-17	µCi/mL		2.9E-17	Calculation	06/07/2013 1653 WN
Radium 226 Precision (±)	2.9E-17	µCi/mL			Calculation	06/07/2013 1653 WN
Thorium 230	0.2	pCi/Filter		0.200	ACW10	05/09/2013 802 MB
Thorium-230 Precision (±)	0.2	pCi/Filter			ACW10	05/09/2013 802 MB
Thorium 230	2.9E-17	µCi/mL	J	2.9E-17	Calculation	06/07/2013 1653 WN
Thorium 230 Precision (±)	2.9E-17	µCi/mL	J		Calculation	06/07/2013 1653 WN
Uranium	0.600	pCi/Filter		0.200	EPA 200.8	04/23/2013 2059 MS
Uranium	8.7E-17	µCi/mL		2.9E-17	Calculation	06/07/2013 1653 WN

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



Inter-Mountain Labs

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

ANALYTICAL QC SUMMARY REPORT**CLIENT:** Powertech Uranium USA Inc.**Date:** 5/17/2013**Work Order:** S1304119**Report ID:** S1304119001**Project:** Dewey-Burdock Project**Uranium, Air Filter Analysis**

Sample Type	MBLK	Units: pCi/Filter								
Sample ID	RunNo: 94346	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
MBLK	04/23/13 11:44	Uranium	ND	0.3						

Sample Type	LCS	Units: pCi/Filter								
Sample ID	RunNo: 94346	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
LCS	04/23/13 11:40	Uranium	69.8	0.3	67.7		103	85 - 115		

Sample Type	MS	Units: pCi/Filter								
Sample ID	RunNo: 94346	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
S1304119-003AS	04/23/13 21:08	Uranium	757	0.3	745	0.6	102	70 - 130		

Sample Type	MSD	Units: pCi/Filter								
Sample ID	RunNo: 94346	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual	
S1304119-003AMSD	04/23/13 21:23	Uranium	733	0.3	745	3.15	98.3	20		

Sample Type	DUP	Units: pCi/Filter								
Sample ID	RunNo: 94346	Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual	
S1304119-001AD	04/23/13 14:45	Uranium	ND	0.3	ND			20		

Lead 210 in Filters

Sample Type	MBLK	Units: pCi/Filter								
Sample ID	RunNo: 95078	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
AMB13-115	05/07/13 16:12	Lead 210	ND	2						

Sample Type	LCS	Units: pCi/Filter								
Sample ID	RunNo: 95078	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
LCS13-115	05/07/13 16:12	Lead 210	15	2	12.3		119	70 - 130		

Sample Type	MS	Units: pCi/Filter								
Sample ID	RunNo: 94837	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
TAP WATER MS	05/05/13 16:31	Lead 210	14	2	12.1	ND	117	70 - 130		

Sample Type	MSD	Units: pCi/Filter								
Sample ID	RunNo: 94837	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual	
TAP WATER MSD	05/05/13 16:31	Lead 210	14	2	12.1	0.860	118	30		

Qualifiers:

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- L Analyzed by a contract laboratory
- O Outside the Range of Dilutions
- S Spike Recovery outside accepted recovery limits

- E Value above quantitation range
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits



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Your Environmental Monitoring Partner

ANALYTICAL QC SUMMARY REPORT**CLIENT:** Powertech Uranium USA Inc.**Date:** 5/17/2013**Work Order:** S1304119**Report ID:** S1304119001**Project:** Dewey-Burdock Project**Radium 226 Air Filter Analysis**

Sample Type	MBLK	Units: pCi/Filter								
Sample ID	RunNo: 94782	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
AMB13-114	04/30/13 15:30	Radium 226	ND	0.3						

Sample Type	LCS	Units: pCi/Filter								
Sample ID	RunNo: 94782	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
ALCS13-114	04/30/13 15:30	Radium 226	5.4	0.3	5.18		105	70 - 130		

Sample Type	MS	Units: pCi/Filter								
Sample ID	RunNo: 94782	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
TAP WATER MS	04/30/13 15:30	Radium 226	6.0	0.3	5.18	ND	117	70 - 130		

Sample Type	MSD	Units: pCi/Filter								
Sample ID	RunNo: 94782	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual	
TAP WATER MSD	04/30/13 15:30	Radium 226	6.0	0.3	5.18	0.215	116	30		

Sample Type	DUP	Units: pCi/Filter								
Sample ID	RunNo: 94782	Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual	
S1304119-001ADUP	04/30/13 15:30	Radium 226	ND	0.3	ND			20		

Thorium Air Filter Analysis

Sample Type	MBLK	Units: pCi/Filter								
Sample ID	RunNo: 95096	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
MB13-119	05/09/13 8:02	Thorium-230	ND	0.2						

Sample Type	LCS	Units: pCi/Filter								
Sample ID	RunNo: 95096	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
LCS13-119	05/09/13 8:02	Thorium-230	21.3	0.2	25		85.2	70 - 130		

Sample Type	DUP	Units: pCi/Filter								
Sample ID	RunNo: 95096	Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual	
S1304119-001A DUP	05/09/13 8:02	Thorium-230	0.2	0.2	0.2	22.3		30		

Qualifiers:

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- L Analyzed by a contract laboratory
- O Outside the Range of Dilutions
- S Spike Recovery outside accepted recovery limits

- E Value above quantitation range
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits



Inter-Mountain Labs

Sheridan, WY and Gillette, WY

- CHAIN OF CUSTODY RECORD -

Page 1 of 1

All shaded fields must be completed.

This is a legal document; any misrepresentation may be construed as fraud.

#WEB

Client Name PowerTech (USA) Inc.				Project Identification Dewey-Burdock Project				Sampler (Signature/Attestation of Authenticity)				Telephone # 605-662-8308			
Report Address 5575 DTC Parkway #140 Greenwood Village, CO 80111				Contact Name Lisa Scheinost				ANALYSES / PARAMETERS							
Invoice Address 5575 DTC Parkway #140 Greenwood Village, CO 80111				Email escheinost@powertechuranium.com											
				Phone 303-790-7528											
				Purchase Order # 149				Quote # PT1208081							
ITEM	LAB ID (Lab Use Only)	DATE SAMPLED	TIME	SAMPLE IDENTIFICATION		Matrix	# of Containers	U Nat.	Th230	Ra226	Pb210	REMARKS			
1	51309062-001	3/28/13 to 6/28/13		AMS-BKG-Q2		FT	1 w/ 12	X	X	X	X				pls composite filters
2	002	3/28/13 to 6/28/13		AMS-08-Q2		FT	1 w/ 12	X	X	X	X	pls composite filters			
3	003	3/28/13 to 6/28/13		AMS-09-Q2		FT	1 w/ 12	X	X	X	X	pls composite filters			
4															
5															
6												The following are			
7												NRC required LLDs:			
8												U Nat. 5.89E-01 pCi			
9												Th230 5.89E-01 pCi			
10												Ra226 5.89E-01 pCi			
11												Pb210 1.18E+01 pCi			
12												It is very important to			
13												meet the LLDs.			
14												Please call Lisa with			
												questions 3037907528.			
LAB COMMENTS				Relinquished By (Signature/Printed)				DATE	TIME	Received By (Signature/Printed)				DATE	TIME
RRT				/Lisa Scheinost						Kathy Boye				9.3.13	10:41
SHIPPING INFO		MATRIX CODES		TURN AROUND TIMES		COMPLIANCE INFORMATION				ADDITIONAL REMARKS					
<input type="checkbox"/> UPS		Water WT		Check desired service		Compliance Monitoring ? N				Please note LLDS above. Thank you.					
<input checked="" type="checkbox"/> FedEx		Soil SL		<input checked="" type="checkbox"/> Standard turnaround		Program (SDWA, NPDES,...)									
<input type="checkbox"/> USPS		Solid SD		<input type="checkbox"/> RUSH - 5 Working Days		PWSID / Permit #									
<input type="checkbox"/> Hand Carried		Filter FT		<input type="checkbox"/> URGENT - < 2 Working Days		Chlorinated? N									
<input type="checkbox"/> Other		Other OT		Rush & Urgent Surcharges will be applied		Sample Disposal: Lab X Client									

<u>Year</u>	<u>Quarter</u>	<u>Site</u>	<u>Standard Liters</u>	<u>Temp (F)</u>	<u>Pressure (" Hg)</u>	<u>Actual Liters</u>
2013	2	AMS_BKG	109,235,959	53.6	26.50	117,959,269
2013	2	AMS_08	113,021,065	53.6	26.50	122,046,643
2013	2	AMS_09	7,459,890	53.6	26.50	8,055,618



Inter-Mountain Labs

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

Date: 4/14/2014

CLIENT: Powertech Uranium USA Inc.
Project: Dewey-Burdock
Lab Order: S1309062

CASE NARRATIVE

Report ID: S1309062002
(Replaces S1309062001)

Samples AMS-08-Q2, AMS-09-Q2, and AMS-BKG-Q2 were received on September 3, 2013.

All samples were received and analyzed within the EPA recommended holding times, except those noted below in this case narrative. Samples were analyzed using the methods outlined in the following references:

"Standard Methods For The Examination of Water and Wastewater", approved method versions

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition

40 CFR Parts 136 and 141

40 CFR Part 50, Appendices B, J, L, and O

Methods indicated in the Methods Update Rule published in the Federal Register Friday, May 18, 2012

ASTM approved and recognized standards

All Quality Control parameters met the acceptance criteria defined by EPA and Inter-Mountain Laboratories except as indicated in this case narrative.

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: Powertech Uranium USA Inc.
P.O. Box 812
Edgemont, SD 57735

Date Reported 5/23/2014
Report ID S1309062004
(Replaces S1309062003)

ProjectName: Dewey-Burdock
Lab ID: S1309062-001
ClientSample ID: AMS-BKG-Q2
COC: WEB

WorkOrder: S1309062
CollectionDate: 6/28/2013
DateReceived: 9/3/2013 10:41:00 AM
FieldSampler:
Matrix: Filter

Comments Sampled 3/28/13-6/28/13 (2013 Q2)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
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Field

Actual Volume 117959269 Liters Field 06/28/2013 000

Radionuclides - Filter

Lead 210	1460	pCi/Filter		80.0	OTW01	09/30/2013 1259	SH
Lead 210 Precision (±)	78	pCi/Filter			OTW01	09/30/2013 1259	SH
Lead 210	1.2E-14	µCi/mL		6.8E-16	Calculation	05/19/2014 1031	WN
Lead 210 Precision (±)	6.6E-16	µCi/mL			Calculation	05/19/2014 1031	WN
Radium 226	4.8	pCi/Filter	J	6.00	SM 7500RAB	09/16/2013 1610	SH
Radium 226 Precision (±)	2.4	pCi/Filter	J		SM 7500RAB	09/16/2013 1610	SH
Radium 226	4.1E-17	µCi/mL	J	5.1E-17	Calculation	05/19/2014 1031	WN
Radium 226 Precision (±)	2.0E-17	µCi/mL	J		Calculation	05/19/2014 1031	WN
Thorium 230	1.3	pCi/Filter	J	6.00	ACW10	09/19/2013 1210	MB
Thorium-230 Precision (±)	1.2	pCi/Filter	J		ACW10	09/19/2013 1210	MB
Thorium 230	1.1E-17	µCi/mL	J	5.1E-17	Calculation	05/19/2014 1031	WN
Thorium 230 Precision (±)	1.0E-17	µCi/mL	J		Calculation	05/19/2014 1031	WN
Uranium	1.62	pCi/Filter	J	6.00	EPA 200.8	09/11/2013 1240	MS
Uranium	1.4E-17	µCi/mL	J	5.1E-17	Calculation	05/19/2014 1031	WN

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager

Page 1 of 3



Sample Analysis Report

Company: Powertech Uranium USA Inc.
P.O. Box 812
Edgemont, SD 57735

Date Reported 5/23/2014
Report ID S1309062004
(Replaces S1309062003)

ProjectName: Dewey-Burdock
Lab ID: S1309062-002
ClientSample ID: AMS-08-Q2
COC: WEB

WorkOrder: S1309062
CollectionDate: 6/28/2013
DateReceived: 9/3/2013 10:41:00 AM
FieldSampler:
Matrix: Filter

Comments Sampled 3/28/13-6/28/13 (2013 Q2)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
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Field

Actual Volume	122046643	Liters			Field	06/28/2013 000
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Radionuclides - Filter

Lead 210	1400	pCi/Filter		80.0	OTW01	09/30/2013 1259	SH
Lead 210 Precision (±)	74	pCi/Filter			OTW01	09/30/2013 1259	SH
Lead 210	1.2E-14	µCi/mL		6.6E-16	Calculation	05/19/2014 1031	WN
Lead 210 Precision (±)	6.1E-16	µCi/mL			Calculation	05/19/2014 1031	WN
Radium 226	2.2	pCi/Filter	J	6.00	SM 7500RAB	09/16/2013 1610	SH
Radium 226 Precision (±)	1.2	pCi/Filter	J		SM 7500RAB	09/16/2013 1610	SH
Radium 226	1.8E-17	µCi/mL	J	4.9E-17	Calculation	05/19/2014 1031	WN
Radium 226 Precision (±)	9.8E-18	µCi/mL	J		Calculation	05/19/2014 1031	WN
Thorium 230	1.0	pCi/Filter	J	6.00	ACW10	09/19/2013 1210	MB
Thorium-230 Precision (±)	1.2	pCi/Filter	J		ACW10	09/19/2013 1210	MB
Thorium 230	8.2E-18	µCi/mL	J	4.9E-17	Calculation	05/19/2014 1031	WN
Thorium 230 Precision (±)	9.8E-18	µCi/mL	J		Calculation	05/19/2014 1031	WN
Uranium	2.26	pCi/Filter	J	6.00	EPA 200.8	09/11/2013 1301	MS
Uranium	1.9E-17	µCi/mL	J	4.9E-17	Calculation	05/19/2014 1031	WN

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager

Page 2 of 3



Sample Analysis Report

Company: Powertech Uranium USA Inc.
P.O. Box 812
Edgemont, SD 57735

Date Reported 5/23/2014
Report ID S1309062004
(Replaces S1309062003)

ProjectName: Dewey-Burdock
Lab ID: S1309062-003
ClientSample ID: AMS-09-Q2
COC: WEB

WorkOrder: S1309062
CollectionDate: 6/28/2013
DateReceived: 9/3/2013 10:41:00 AM
FieldSampler:
Matrix: Filter

Comments Sampled 3/28/13-6/28/13 (2013 Q2)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
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Field

Actual Volume	8055618	Liters			Field	06/28/2013 000
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Radionuclides - Filter

Lead 210	15.1	pCi/Filter		2.00	OTW01	09/30/2013 1259	SH
Lead 210 Precision (±)	2.9	pCi/Filter			OTW01	09/30/2013 1259	SH
Lead 210	1.9E-15	µCi/mL		2.5E-16	Calculation	05/23/2014 1233	WN
Lead 210 Precision (±)	3.6E-16	µCi/mL			Calculation	05/23/2014 1233	WN
Radium 226	0.6	pCi/Filter		0.200	SM 7500RAB	09/16/2013 1610	SH
Radium 226 Precision (±)	0.2	pCi/Filter			SM 7500RAB	09/16/2013 1610	SH
Radium 226	7.4E-17	µCi/mL		2.5E-17	Calculation	05/23/2014 1233	WN
Radium 226 Precision (±)	2.5E-17	µCi/mL			Calculation	05/23/2014 1233	WN
Thorium 230	0.3	pCi/Filter		0.200	ACW10	09/19/2013 1210	MB
Thorium-230 Precision (±)	0.2	pCi/Filter			ACW10	09/19/2013 1210	MB
Thorium 230	3.7E-17	µCi/mL		2.5E-17	Calculation	05/23/2014 1233	WN
Thorium 230 Precision (±)	2.5E-17	µCi/mL			Calculation	05/23/2014 1233	WN
Uranium	0.806	pCi/Filter		0.200	EPA 200.8	09/11/2013 1317	MS
Uranium	1.0E-16	µCi/mL		2.5E-17	Calculation	05/23/2014 1233	WN

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager

Page 3 of 3



Inter-Mountain Labs

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

ANALYTICAL QC SUMMARY REPORT**CLIENT:** Powertech Uranium USA Inc.**Date:** 10/11/2013**Work Order:** S1309062**Report ID:** S1309062001**Project:** Dewey-Burdock**Uranium, Air Filter Analysis**

Sample Type	MBLK	Units: pCi/Filter								
Sample ID	RunNo: 99704	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
MBLK	09/11/13 12:18	Uranium	ND	0.3						

Sample Type	LCS	Units: pCi/Filter								
Sample ID	RunNo: 99704	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
LCS	09/11/13 12:13	Uranium	69.7	0.3	67.7		103	85 - 115		

Sample Type	MS	Units: pCi/Filter								
Sample ID	RunNo: 99704	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
S1309062-001AS	09/11/13 12:51	Uranium	756	0.3	745	ND	102	70 - 130		

Sample Type	MSD	Units: pCi/Filter								
Sample ID	RunNo: 99704	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual	
S1309062-001AMSD	09/11/13 12:56	Uranium	752	0.3	745	0.551	101	20		

Sample Type	DUP	Units: pCi/Filter								
Sample ID	RunNo: 99704	Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual	
S1309062-001AD	09/11/13 12:45	Uranium	ND	0.3	ND			20		

Lead 210 in Filters

Sample Type	MBLK	Units: pCi/Filter								
Sample ID	RunNo: 100699	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
MB13-255	09/30/13 12:59	Lead 210	ND	2						

Sample Type	LCS	Units: pCi/Filter								
Sample ID	RunNo: 100699	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
LCS13-255	09/30/13 10:13	Lead 210	15	2	12.2		121	70 - 130		

Sample Type	MS	Units: pCi/Filter								
Sample ID	RunNo: 100699	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
TAP WATER MS	09/30/13 10:13	Lead 210	14	2	12.5	ND	112	70 - 130		

Sample Type	MSD	Units: pCi/Filter								
Sample ID	RunNo: 100699	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual	
TAP WATER MSD	09/30/13 10:13	Lead 210	15	2	12.5	5.45	118	30		

Qualifiers:

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- L Analyzed by a contract laboratory
- O Outside the Range of Dilutions
- S Spike Recovery outside accepted recovery limits

- E Value above quantitation range
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits



Inter-Mountain Labs

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

ANALYTICAL QC SUMMARY REPORT**CLIENT:** Powertech Uranium USA Inc.**Date:** 10/11/2013**Work Order:** S1309062**Report ID:** S1309062001**Project:** Dewey-Burdock**Radium 226 Air Filter Analysis**

Sample Type	MBLK	Units: pCi/Filter								
Sample ID	RunNo: 99881	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
MB13-255	09/16/13 16:10	Radium 226	ND	0.3						

Sample Type	LCS	Units: pCi/Filter								
Sample ID	RunNo: 99881	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
LCS13-255	09/16/13 16:10	Radium 226	5.2	0.3	5		105	70 - 130		

Sample Type	MS	Units: pCi/Filter								
Sample ID	RunNo: 99881	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
TAP WATER MS	09/16/13 16:10	Radium 226	5.3	0.3	5	ND	106	70 - 130		

Sample Type	MSD	Units: pCi/Filter								
Sample ID	RunNo: 99881	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual	
TAP WATER MSD	09/16/13 16:10	Radium 226	5.5	0.3	553	3.09	110	30		

Thorium Air Filter Analysis

Sample Type	MBLK	Units: pCi/Filter								
Sample ID	RunNo: 100105	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
MB13-256	09/19/13 8:06	Thorium-230	ND	0.2						

Sample Type	LCS	Units: pCi/Filter								
Sample ID	RunNo: 100105	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
LCS13-256	09/19/13 8:06	Thorium-230	11.0	0.2	12.5		88.1	70 - 130		

Sample Type	DUP	Units: pCi/Filter								
Sample ID	RunNo: 100105	Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual	
S1308480-002A DUP	09/19/13 8:06	Thorium-230	0.5	0.2	ND			20		

Qualifiers:

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- L Analyzed by a contract laboratory
- O Outside the Range of Dilutions
- S Spike Recovery outside accepted recovery limits

- E Value above quantitation range
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits



Inter-Mountain Labs
Sheridan, WY and Gillette, WY

- CHAIN OF CUSTODY RECORD -

Page 1 of 1

All shaded fields must be completed.

This is a legal document, any misrepresentation may be construed as fraud.

#WEB

Client Name Powertech (USA) Inc.		Project Identification Dewey Burdock Project		Sampler (Signature/Attestation of Authenticity) <i>Lisa Scheinost</i>		Telephone # 605-662-8308										
Report Address 5575 DTC Parkway #140 Greenwood Village, CO 80111		Contact Name Lisa Scheinost		ANALYSES / PARAMETERS												
Invoice Address 5575 DTC Parkway #140 Greenwood Village, CO 80111		Email lscheinost@powertechuranium.com														
Phone 303-790-7528		Purchase Order # 149		Quote # PT1208081		REMARKS										
ITEM	LAB ID (Lab Use Only)	DATE SAMPLED	TIME SAMPLED	SAMPLE IDENTIFICATION	Matrix	# of Containers	U Nat.	Th230	Ra226	Pb210						
1	5B10129-001	6/28/13 to 10/2/13		AMS-BKG-Q3	FT	1 w/ 14	X	X	X	X						pls composite filters
2	002	6/28/13 to 10/2/13		AMS-08-Q3	FT	1 w/ 14	X	X	X	X						pls composite filters
3	003	6/28/13 to 10/2/13		AMS-09-Q3	FT	1 w/ 14	X	X	X	X						pls composite filters
4	004	8/9/13 to 10/2/13		AMS-01-P1	FT	1 w/ 8	X									pls composite filters
5	005	8/9/13 to 10/2/13		AMS-02-P1	FT	1 w/ 8	X									pls composite filters
6	006	8/9/13 to 10/2/13		AMS-03-P1	FT	1 w/ 8	X									pls composite filters
7	007	8/9/13 to 10/2/13		AMS-04-P1	FT	1 w/ 8	X									pls composite filters
8																
9																
10																NOTE: NRC Required
11																LLDs are as follows -
12																U Nat. 5.89E-01 pCi
13																Th230 5.89E-01 pCi
14																Ra226 5.89E-01 pCi
																Pb210 1.18E+01 pCi
LAB COMMENTS		Relinquished By (Signature/Printed) <i>Lisa Scheinost</i> / Lisa Scheinost				DATE 10-4-13	TIME 2:19 PM	Received By (Signature/Printed) <i>Kathy Boyd</i>				DATE 10-10-13	TIME 9:20			
SHIPPING INFO		MATRIX CODES		TURN AROUND TIMES		COMPLIANCE INFORMATION		ADDITIONAL REMARKS								
<input type="checkbox"/> UPS	Water	WT	Check desired service		Compliance Monitoring ?		N	Please note LLDS above. Thank you. Contact Lisa with questions at 3037907528.								
<input checked="" type="checkbox"/> FedEx	Soil	SL	<input checked="" type="checkbox"/> Standard turnaround		Program (SDWA, NPDES,...)											
<input type="checkbox"/> USPS	Solid	SD	<input type="checkbox"/> RUSH - 5 Working Days		PWSID / Permit #											
<input type="checkbox"/> Hand Carried	Filter	FT	<input type="checkbox"/> URGENT - < 2 Working Days		Chlorinated?		N									
<input type="checkbox"/> Other	Other	OT	Rush & Urgent Surcharges will be applied		Sample Disposal: Lab		X	Client								

<u>Year</u>	<u>Quarter</u>	<u>Site</u>	<u>Standard Liters</u>	<u>Temp (F)</u>	<u>Pressure (" Hg)</u>	<u>Actual Liters</u>
2013	3	AMS_01	73,845,921	70.9	26.60	82,116,143
2013	3	AMS_02	78,300,176	70.9	26.60	87,069,243
2013	3	AMS_03	73,431,944	70.9	26.60	81,655,803
2013	3	AMS_04	65,531,120	70.9	26.60	72,870,143
2013	3	AMS_08	130,151,400	70.9	26.60	144,727,439
2013	3	AMS_09	7,821,322	70.9	26.60	8,697,255
2013	3	AMS_BKG	120,269,509	70.9	26.60	133,738,845



Inter-Mountain Labs

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

Date: 11/1/2013

CLIENT: Powertech Uranium USA Inc.
Project: Dewey-Burdock Project
Lab Order: S1310169

CASE NARRATIVE
Report ID: S1310169001

Samples AMS-01-P1, AMS-02-P1, AMS-03-P1, AMS-04-P1, AMS-08-Q3, AMS-09-Q3, and AMS-BKG-Q3 were received on October 10, 2013.

All samples were received and analyzed within the EPA recommended holding times, except those noted below in this case narrative. Samples were analyzed using the methods outlined in the following references:

"Standard Methods For The Examination of Water and Wastewater", approved method versions
Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition
40 CFR Parts 136 and 141
40 CFR Part 50, Appendices B, J, L, and O
Methods indicated in the Methods Update Rule published in the Federal Register Friday, May 18, 2012
ASTM approved and recognized standards

All Quality Control parameters met the acceptance criteria defined by EPA and Inter-Mountain Laboratories except as indicated in this case narrative.

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager

Page 1 of 1

ED_005364I_00070164-00101



Sample Analysis Report

Company: Powertech Uranium USA Inc.
P.O. Box 812
Edgemont, SD 57735

Date Reported 5/16/2014
Report ID S1310169003
(Replaces S1310169002)

ProjectName: Dewey-Burdock Project
Lab ID: S1310169-001
ClientSample ID: AMS-BKG-Q3
COC: WEB

WorkOrder: S1310169
CollectionDate:
DateReceived: 10/10/2013 9:20:00 AM
FieldSampler: LS
Matrix: Filter

Comments Sampled 6/28/13-10/2/13 (2013 Q3)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
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Field

Actual Volume	133738845	Liters			Field	
Radionuclides - Filter						
Lead 210	2090	pCi/Filter		80.0	OTW01	10/29/2013 952 SH
Lead 210 Precision (±)	94	pCi/Filter			OTW01	10/29/2013 952 SH
Lead 210	1.6E-14	µCi/mL		6.0E-16	Calculation	05/19/2014 1127 WN
Lead 210 Precision (±)	7.0E-16	µCi/mL			Calculation	05/19/2014 1127 WN
Radium 226	1.3	pCi/Filter	J	6.00	SM 7500RAB	10/22/2013 1701 SH
Radium 226 Precision (±)	1.2	pCi/Filter	J		SM 7500RAB	10/22/2013 1701 SH
Radium 226	9.7E-18	µCi/mL	J	4.5E-17	Calculation	05/19/2014 1127 WN
Radium 226 Precision (±)	9.0E-18	µCi/mL	J		Calculation	05/19/2014 1127 WN
Thorium 230	0.8	pCi/Filter	J	6.00	ACW10	10/22/2013 804 MB
Thorium-230 Precision (±)	1.2	pCi/Filter	J		ACW10	10/22/2013 804 MB
Thorium 230	6.0E-18	µCi/mL	J	4.5E-17	Calculation	05/19/2014 1127 WN
Thorium 230 Precision (±)	9.0E-18	µCi/mL	J		Calculation	05/19/2014 1127 WN
Uranium	0.189	pCi/Filter	J	6.00	EPA 200.8	10/14/2013 1851 MS
Uranium	1.4E-18	µCi/mL	J	4.5E-17	Calculation	05/19/2014 1127 WN

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager

Page 1 of 7



Sample Analysis Report

Company: Powertech Uranium USA Inc.
P.O. Box 812
Edgemont, SD 57735

Date Reported 5/16/2014
Report ID S1310169003
(Replaces S1310169002)

ProjectName: Dewey-Burdock Project
Lab ID: S1310169-002
ClientSample ID: AMS-08-Q3
COC: WEB

WorkOrder: S1310169
CollectionDate:
DateReceived: 10/10/2013 9:20:00 AM
FieldSampler: LS
Matrix: Filter

Comments Sampled 6/28/13-10/2/13 (2013 Q3)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
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Field

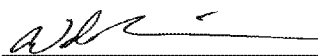
Actual Volume	144727439	Liters			Field	
Radionuclides - Filter						
Lead 210	1600	pCi/Filter		80.0	OTW01	10/29/2013 1201 SH
Lead 210 Precision (±)	84	pCi/Filter			OTW01	10/29/2013 1201 SH
Lead 210	1.1E-14	µCi/mL		5.5E-16	Calculation	05/19/2014 1127 WN
Lead 210 Precision (±)	5.8E-16	µCi/mL			Calculation	05/19/2014 1127 WN
Radium 226	1.9	pCi/Filter	J	6.00	SM 7500RAB	10/22/2013 1701 SH
Radium 226 Precision (±)	1.2	pCi/Filter	J		SM 7500RAB	10/22/2013 1701 SH
Radium 226	1.3E-17	µCi/mL	J	4.1E-17	Calculation	05/19/2014 1127 WN
Radium 226 Precision (±)	8.3E-18	µCi/mL	J		Calculation	05/19/2014 1127 WN
Thorium 230	2.9	pCi/Filter	J	6.00	ACW10	10/22/2013 804 MB
Thorium-230 Precision (±)	2.4	pCi/Filter	J		ACW10	10/22/2013 804 MB
Thorium 230	2.0E-17	µCi/mL	J	4.1E-17	Calculation	05/19/2014 1127 WN
Thorium 230 Precision (±)	1.7E-17	µCi/mL	J		Calculation	05/19/2014 1127 WN
Uranium	0.0747	pCi/Filter	J	6.00	EPA 200.8	10/14/2013 1856 MS
Uranium	5.2E-19	µCi/mL	J	4.1E-17	Calculation	05/19/2014 1127 WN

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by:



Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: Powertech Uranium USA Inc.
P.O. Box 812
Edgemont, SD 57735

Date Reported 5/16/2014
Report ID S1310169003
(Replaces S1310169002)

ProjectName: Dewey-Burdock Project
Lab ID: S1310169-003
ClientSample ID: AMS-09-Q3
COC: WEB

WorkOrder: S1310169
CollectionDate:
DateReceived: 10/10/2013 9:20:00 AM
FieldSampler: LS
Matrix: Filter

Comments Sampled 6/28/13-10/2/13 (2013 Q3)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
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Field

Actual Volume	8697255	Liters			Field	
Radionuclides - Filter						
Lead 210	14.4	pCi/Filter		2.00	OTW01	10/29/2013 1201 SH
Lead 210 Precision (±)	2.9	pCi/Filter			OTW01	10/29/2013 1201 SH
Lead 210	1.7E-15	µCi/mL		2.3E-16	Calculation	05/19/2014 1127 WN
Lead 210 Precision (±)	3.3E-16	µCi/mL			Calculation	05/19/2014 1127 WN
Radium 226	0.5	pCi/Filter		0.200	SM 7500RAB	10/22/2013 1701 SH
Radium 226 Precision (±)	0.1	pCi/Filter			SM 7500RAB	10/22/2013 1701 SH
Radium 226	5.7E-17	µCi/mL		2.3E-17	Calculation	05/19/2014 1127 WN
Radium 226 Precision (±)	1.1E-17	µCi/mL			Calculation	05/19/2014 1127 WN
Thorium 230	0.3	pCi/Filter		0.200	ACW10	10/22/2013 804 MB
Thorium-230 Precision (±)	0.2	pCi/Filter			ACW10	10/22/2013 804 MB
Thorium 230	3.4E-17	µCi/mL		2.3E-17	Calculation	05/19/2014 1127 WN
Thorium 230 Precision (±)	2.3E-17	µCi/mL			Calculation	05/19/2014 1127 WN
Uranium	0.503	pCi/Filter		0.200	EPA 200.8	10/14/2013 1902 MS
Uranium	5.8E-17	µCi/mL		2.3E-17	Calculation	05/19/2014 1127 WN

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager

Page 3 of 7



Sample Analysis Report

Company: Powertech Uranium USA Inc.
P.O. Box 812
Edgemont, SD 57735

Date Reported 5/16/2014
Report ID S1310169003
(Replaces S1310169002)

ProjectName: Dewey-Burdock Project

WorkOrder: S1310169

Lab ID: S1310169-004

CollectionDate:

ClientSample ID: AMS-01-P1

DateReceived: 10/10/2013 9:20:00 AM

COC: WEB

FieldSampler: LS

Matrix: Filter

Comments Sampled 8/9/13-10/2/13 (2013 P1)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
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Field

Actual Volume 82116143 Liters Field

Radionuclides - Filter

Uranium	0.236	pCi/Filter	J	6.00	EPA 200.8	10/14/2013 1907	MS
Uranium	2.9E-18	µCi/mL	J	7.3E-17	Calculation	05/19/2014 1127	WN

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: Powertech Uranium USA Inc.
P.O. Box 812
Edgemont, SD 57735

Date Reported 5/16/2014
Report ID S1310169003
(Replaces S1310169002)

ProjectName: Dewey-Burdock Project

WorkOrder: S1310169

Lab ID: S1310169-005

CollectionDate:

ClientSample ID: AMS-02-P1

DateReceived: 10/10/2013 9:20:00 AM

COC: WEB

FieldSampler: LS

Matrix: Filter

Comments Sampled 8/9/13-10/2/13 (2013 P1)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
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Field

Actual Volume 87069243 Liters Field

Radionuclides - Filter

Uranium	1.33	pCi/Filter	J	6.00	EPA 200.8	10/14/2013 1924	MS
Uranium	1.5E-17	µCi/mL	J	6.9E-17	Calculation	05/19/2014 1127	WN

These results apply only to the samples tested.**RL - Reporting Limit**

Qualifiers: B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
M Value exceeds Monthly Ave or MCL or is less than LCL
O Outside the Range of Dilutions
X Matrix Effect

C Calculated Value
H Holding times for preparation or analysis exceeded
L Analyzed by a contract laboratory
ND Not Detected at the Reporting Limit
S Spike Recovery outside accepted recovery limits

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: Powertech Uranium USA Inc.
P.O. Box 812
Edgemont, SD 57735

Date Reported 5/16/2014
Report ID S1310169003
(Replaces S1310169002)

ProjectName: Dewey-Burdock Project

WorkOrder: S1310169

Lab ID: S1310169-006

CollectionDate:

ClientSample ID: AMS-03-P1

DateReceived: 10/10/2013 9:20:00 AM

COC: WEB

FieldSampler: LS

Matrix: Filter

Comments Sampled 8/9/13-10/2/13 (2013 P1)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
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Field

Actual Volume 81655803 Liters Field

Radionuclides - Filter

Uranium	2.13	pCi/Filter	J	6.00	EPA 200.8	10/14/2013 1945	MS
Uranium	2.6E-17	µCi/mL	J	7.3E-17	Calculation	05/19/2014 1127	WN

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers: B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
M Value exceeds Monthly Ave or MCL or is less than LCL
O Outside the Range of Dilutions
X Matrix Effect

C Calculated Value
H Holding times for preparation or analysis exceeded
L Analyzed by a contract laboratory
ND Not Detected at the Reporting Limit
S Spike Recovery outside accepted recovery limits

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: Powertech Uranium USA Inc.
P.O. Box 812
Edgemont, SD 57735

Date Reported 5/16/2014
Report ID S1310169003
(Replaces S1310169002)

ProjectName: Dewey-Burdock Project

WorkOrder: S1310169

Lab ID: S1310169-007

CollectionDate:

ClientSample ID: AMS-04-P1

DateReceived: 10/10/2013 9:20:00 AM

COC: WEB

FieldSampler: LS

Matrix: Filter

Comments Sampled 8/9/13-10/2/13 (2013 P1)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
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Field

Actual Volume 72870143 Liters Field

Radionuclides - Filter

Uranium	0.131	pCi/Filter	J	6.00	EPA 200.8	10/14/2013 1950	MS
Uranium	1.8E-18	µCi/mL	J	8.2E-17	Calculation	05/19/2014 1127	WN

These results apply only to the samples tested.**RL - Reporting Limit**

Qualifiers: B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
M Value exceeds Monthly Ave or MCL or is less than LCL
O Outside the Range of Dilutions
X Matrix Effect

C Calculated Value
H Holding times for preparation or analysis exceeded
L Analyzed by a contract laboratory
ND Not Detected at the Reporting Limit
S Spike Recovery outside accepted recovery limits

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



Inter-Mountain Labs

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

ANALYTICAL QC SUMMARY REPORT**CLIENT:** Powertech Uranium USA Inc.**Date:** 11/1/2013**Work Order:** S1310169**Report ID:** S1310169001**Project:** Dewey-Burdock Project**Uranium, Air Filter Analysis**

Sample Type	MBLK	Units: pCi/Filter								
Sample ID	RunNo: 100814	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
MBLK	10/14/13 12:58	Uranium	ND	0.3						

Sample Type	LCS	Units: pCi/Filter								
Sample ID	RunNo: 100814	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
LCS	10/14/13 12:53	Uranium	68.8	0.3	67.7		102	85 - 115		

Sample Type	MS	Units: pCi/Filter								
Sample ID	RunNo: 100814	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
S1310169-005AS	10/14/13 19:34	Uranium	9040	0.3	8940	1.3	101	70 - 130		

Sample Type	MSD	Units: pCi/Filter								
Sample ID	RunNo: 100814	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual	
S1310169-005AMSD	10/14/13 19:40	Uranium	9250	0.3	9040	2.32	103	20		

Sample Type	DUP	Units: pCi/Filter								
Sample ID	RunNo: 100814	Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual	
S1310169-005AD	10/14/13 19:29	Uranium	1.4	0.3	1.3	1.83		20		

Lead 210 in Filters

Sample Type	MBLK	Units: pCi/Filter								
Sample ID	RunNo: 101390	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
MB13-287	10/29/13 9:52	Lead 210	ND	2						

Sample Type	LCS	Units: pCi/Filter								
Sample ID	RunNo: 101390	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
LCS13-287	10/28/13 14:37	Lead 210	14	2	12.1		111	70 - 130		

Sample Type	MS	Units: pCi/Filter								
Sample ID	RunNo: 101390	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
TAP WATER MS	10/28/13 14:37	Lead 210	15	2	12.4	ND	120	70 - 130		

Sample Type	MSD	Units: pCi/Filter								
Sample ID	RunNo: 101390	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual	
TAP WATER MSD	10/28/13 14:37	Lead 210	15	2	12.4	3.09	116	30		

Qualifiers:

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- L Analyzed by a contract laboratory
- O Outside the Range of Dilutions
- S Spike Recovery outside accepted recovery limits

- E Value above quantitation range
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits



Inter-Mountain Labs

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

ANALYTICAL QC SUMMARY REPORT**CLIENT:** Powertech Uranium USA Inc.**Date:** 11/1/2013**Work Order:** S1310169**Report ID:** S1310169001**Project:** Dewey-Burdock Project**Radium 226 Air Filter Analysis**

Sample Type	MBLK	Units: pCi/Filter								
Sample ID	RunNo: 101104	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
MB13-289	10/22/13 13:55	Radium 226	ND	0.3						

Sample Type	LCS	Units: pCi/Filter								
Sample ID	RunNo: 101104	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
LCS13-289	10/22/13 17:01	Radium 226	5.0	0.3	5.02		100	70 - 130		

Sample Type	MS	Units: pCi/Filter								
Sample ID	RunNo: 101104	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
TAP WATER MS	10/22/13 17:01	Radium 226	5.1	0.3	5.02	ND	101	70 - 130		

Sample Type	MSD	Units: pCi/Filter								
Sample ID	RunNo: 101104	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual	
TAP WATER MSD	10/22/13 17:01	Radium 226	5.2	0.3	5.02	1.26	103	30		

Thorium Air Filter Analysis

Sample Type	MBLK	Units: pCi/Filter								
Sample ID	RunNo: 101172	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
MB13-288	10/22/13 8:04	Thorium-230	ND	0.2						

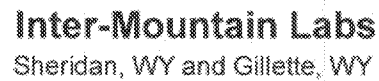
Sample Type	LCS	Units: pCi/Filter								
Sample ID	RunNo: 101172	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
LCS13-288	10/22/13 8:04	Thorium-230	14.5	0.2	12.5		116	70 - 130		

Sample Type	LCSD	Units: pCi/Filter								
Sample ID	RunNo: 101172	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual	
LCS13-288 DUP	10/22/13 8:04	Thorium-230	15.4	0.2	12.5	5.62	123	30		

Qualifiers:

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- L Analyzed by a contract laboratory
- O Outside the Range of Dilutions
- S Spike Recovery outside accepted recovery limits

- E Value above quantitation range
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits



Page 1 of 1

#WEB

This is a legal document; any misrepresentation may be construed as fraud.

Inter-Mountain Labs, Inc.

<u>Year</u>	<u>Quarter</u>	<u>Site</u>	<u>Standard Liters</u>	<u>Temp (F)</u>	<u>Pressure (" Hg)</u>	<u>Actual Liters</u>
2013	4	AMS_01	124,697,593	30.2	26.60	128,037,458
2013	4	AMS_02	128,858,157	30.2	26.60	132,309,457
2013	4	AMS_03	127,476,022	30.2	26.60	130,890,303
2013	4	AMS_04	115,088,351	30.2	26.60	118,170,845
2013	4	AMS_08	125,856,644	30.2	26.60	129,227,553
2013	4	AMS_09	6,244,995	30.2	26.60	6,412,259
2013	4	AMS_BKG	121,654,609	30.2	26.60	124,912,971



Inter-Mountain Labs

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

Date: 4/14/2014

CLIENT: Powertech Uranium USA Inc.
Project: Dewey-Burdock Project
Lab Order: S1401353

CASE NARRATIVE

Report ID: S1401353002
(Replaces S1401353001)

Samples AMS-009 Q4, AMS-01 Q4, AMS-02 Q4, AMS-03 Q4, AMS-04 Q4, AMS-08 Q4, and AMS-BKG were received on January 30, 2014.

All samples were received and analyzed within the EPA recommended holding times, except those noted below in this case narrative. Samples were analyzed using the methods outlined in the following references:

"Standard Methods For The Examination of Water and Wastewater", approved method versions
Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition
40 CFR Parts 136 and 141
40 CFR Part 50, Appendices B, J, L, and O
Methods indicated in the Methods Update Rule published in the Federal Register Friday, May 18, 2012
ASTM approved and recognized standards

All Quality Control parameters met the acceptance criteria defined by EPA and Inter-Mountain Laboratories except as indicated in this case narrative.

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: Powertech Uranium USA Inc.
P.O. Box 812
Edgemont, SD 57735

Date Reported 5/23/2014
Report ID S1401353004
(Replaces S1401353003)

ProjectName: Dewey-Burdock Project
Lab ID: S1401353-001
ClientSample ID: AMS-01 P2
COC: WEB

WorkOrder: S1401353
CollectionDate: 12/30/2013
DateReceived: 1/30/2014 2:20:00 PM
FieldSampler:
Matrix: Filter

Comments Sampled 10/2/13-1/3/14 (2013 P2)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
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Field

Actual Volume 128037458 Liters Field 12/30/2013 000

Radionuclides - Filter

Lead 210	1270	pCi/Filter		80.0	OTW01	02/19/2014 1149	SH
Lead 210 Precision (±)	84	pCi/Filter			OTW01	02/19/2014 1149	SH
Lead 210	9.9E-15	µCi/mL		6.2E-16	Calculation	05/23/2014 1123	WN
Lead 210 Precision (±)	6.6E-16	µCi/mL			Calculation	05/23/2014 1123	WN
Radium 226	1.9	pCi/Filter	J	6.00	SM 7500RAB	02/07/2014 1420	SH
Radium 226 Precision (±)	1.2	pCi/Filter	J		SM 7500RAB	02/07/2014 1420	SH
Radium 226	1.5E-17	µCi/mL	J	4.7E-17	Calculation	05/23/2014 1123	WN
Radium 226 Precision (±)	9.4E-18	µCi/mL	J		Calculation	05/23/2014 1123	WN
Thorium 230	1.2	pCi/Filter	J	6.00	ACW10	02/20/2014 828	MB
Thorium-230 Precision (±)	1.2	pCi/Filter	J		ACW10	02/20/2014 828	MB
Thorium 230	9.4E-18	µCi/mL	J	4.7E-17	Calculation	05/23/2014 1123	WN
Thorium 230 Precision (±)	9.4E-18	µCi/mL	J		Calculation	05/23/2014 1123	WN
Uranium	0.851	pCi/Filter	J	6.00	EPA 200.8	02/04/2014 1635	MS
Uranium	6.6E-18	µCi/mL	J	4.7E-17	Calculation	05/23/2014 1123	WN

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager

Page 1 of 7



Sample Analysis Report

Company: Powertech Uranium USA Inc.
P.O. Box 812
Edgemont, SD 57735

Date Reported 5/19/2014
Report ID S1401353003
(Replaces S1401353002)

ProjectName: Dewey-Burdock Project
Lab ID: S1401353-002
ClientSample ID: AMS-02 P2
COC: WEB

WorkOrder: S1401353
CollectionDate: 12/30/2013
DateReceived: 1/30/2014 2:20:00 PM
FieldSampler:
Matrix: Filter

Comments Sampled 10/2/13-1/3/14 (2013 P2)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
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Field

Actual Volume	132309457	Liters			Field	12/30/2013 000
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Radionuclides - Filter

Lead 210	1750	pCi/Filter		80.0	OTW01	02/19/2014 1149	SH
Lead 210 Precision (±)	91	pCi/Filter			OTW01	02/19/2014 1149	SH
Lead 210	1.3E-14	µCi/mL		6.0E-16	Calculation	05/19/2014 1221	WN
Lead 210 Precision (±)	6.9E-16	µCi/mL			Calculation	05/19/2014 1221	WN
Radium 226	2.0	pCi/Filter	J	6.00	SM 7500RAB	02/07/2014 1420	SH
Radium 226 Precision (±)	1.2	pCi/Filter	J		SM 7500RAB	02/07/2014 1420	SH
Radium 226	1.5E-17	µCi/mL	J	4.5E-17	Calculation	05/19/2014 1221	WN
Radium 226 Precision (±)	9.1E-18	µCi/mL	J		Calculation	05/19/2014 1221	WN
Thorium 230	0.3	pCi/Filter	J	6.00	ACW10	02/20/2014 828	MB
Thorium-230 Precision (±)	1.2	pCi/Filter	J		ACW10	02/20/2014 828	MB
Thorium 230	2.3E-18	µCi/mL	J	4.5E-17	Calculation	05/19/2014 1221	WN
Thorium 230 Precision (±)	9.1E-18	µCi/mL	J		Calculation	05/19/2014 1221	WN
Uranium	1.38	pCi/Filter	J	6.00	EPA 200.8	02/04/2014 1656	MS
Uranium	1.0E-17	µCi/mL	J	4.5E-17	Calculation	05/19/2014 1221	WN

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager

Page 2 of 7



Sample Analysis Report

Company: Powertech Uranium USA Inc.
P.O. Box 812
Edgemont, SD 57735

Date Reported 5/19/2014
Report ID S1401353003
(Replaces S1401353002)

ProjectName: Dewey-Burdock Project
Lab ID: S1401353-003
ClientSample ID: AMS-03 P2
COC: WEB

WorkOrder: S1401353
CollectionDate: 12/30/2013
DateReceived: 1/30/2014 2:20:00 PM
FieldSampler:
Matrix: Filter

Comments Sampled 10/2/13-1/3/14 (2013 P2)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
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Field

Actual Volume	130890303	Liters			Field	12/30/2013 000
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Radionuclides - Filter

Lead 210	2410	pCi/Filter		80.0	OTW01	02/19/2014 1149	SH
Lead 210 Precision (±)	109	pCi/Filter			OTW01	02/19/2014 1149	SH
Lead 210	1.8E-14	µCi/mL		6.1E-16	Calculation	05/19/2014 1221	WN
Lead 210 Precision (±)	8.3E-16	µCi/mL			Calculation	05/19/2014 1221	WN
Radium 226	1.1	pCi/Filter	J	6.00	SM 7500RAB	02/07/2014 1420	SH
Radium 226 Precision (±)	1.0	pCi/Filter	J		SM 7500RAB	02/07/2014 1420	SH
Radium 226	8.4E-18	µCi/mL	J	4.6E-17	Calculation	05/19/2014 1221	WN
Radium 226 Precision (±)	7.6E-18	µCi/mL	J		Calculation	05/19/2014 1221	WN
Thorium 230	0.6	pCi/Filter	J	6.00	ACW10	02/20/2014 828	MB
Thorium-230 Precision (±)	1.2	pCi/Filter	J		ACW10	02/20/2014 828	MB
Thorium 230	4.6E-18	µCi/mL	J	4.6E-17	Calculation	05/19/2014 1221	WN
Thorium 230 Precision (±)	9.2E-18	µCi/mL	J		Calculation	05/19/2014 1221	WN
Uranium	0.983	pCi/Filter	J	6.00	EPA 200.8	02/04/2014 1702	MS
Uranium	7.5E-18	µCi/mL	J	4.6E-17	Calculation	05/19/2014 1221	WN

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager

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Sample Analysis Report

Company: Powertech Uranium USA Inc.
P.O. Box 812
Edgemont, SD 57735

Date Reported 5/19/2014
Report ID S1401353003
(Replaces S1401353002)

ProjectName: Dewey-Burdock Project
Lab ID: S1401353-004
ClientSample ID: AMS-04 P2
COC: WEB

WorkOrder: S1401353
CollectionDate: 12/30/2013
DateReceived: 1/30/2014 2:20:00 PM
FieldSampler:
Matrix: Filter

Comments Sampled 10/2/13-1/3/14 (2013 P2)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
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Field

Actual Volume	118170845	Liters			Field	12/30/2013 000
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Radionuclides - Filter

Lead 210	1950	pCi/Filter		80.0	OTW01	02/19/2014 1149	SH
Lead 210 Precision (±)	106	pCi/Filter			OTW01	02/19/2014 1149	SH
Lead 210	1.7E-14	µCi/mL		6.8E-16	Calculation	05/19/2014 1221	WN
Lead 210 Precision (±)	9.0E-16	µCi/mL			Calculation	05/19/2014 1221	WN
Radium 226	3.0	pCi/Filter	J	6.00	SM 7500RAB	02/07/2014 1420	SH
Radium 226 Precision (±)	1.2	pCi/Filter	J		SM 7500RAB	02/07/2014 1420	SH
Radium 226	2.5E-17	µCi/mL	J	5.1E-17	Calculation	05/19/2014 1221	WN
Radium 226 Precision (±)	1.0E-17	µCi/mL	J		Calculation	05/19/2014 1221	WN
Thorium 230	0.7	pCi/Filter	J	6.00	ACW10	02/20/2014 828	MB
Thorium-230 Precision (±)	1.2	pCi/Filter	J		ACW10	02/20/2014 828	MB
Thorium 230	5.9E-18	µCi/mL	J	5.1E-17	Calculation	05/19/2014 1221	WN
Thorium 230 Precision (±)	1.0E-17	µCi/mL	J		Calculation	05/19/2014 1221	WN
Uranium	1.42	pCi/Filter	J	6.00	EPA 200.8	02/04/2014 1707	MS
Uranium	1.2E-17	µCi/mL	J	5.1E-17	Calculation	05/19/2014 1221	WN

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager

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Sample Analysis Report

Company: Powertech Uranium USA Inc.
P.O. Box 812
Edgemont, SD 57735

Date Reported 5/19/2014
Report ID S1401353003
(Replaces S1401353002)

ProjectName: Dewey-Burdock Project
Lab ID: S1401353-005
ClientSample ID: AMS-08 Q4
COC: WEB

WorkOrder: S1401353
CollectionDate: 12/30/2013
DateReceived: 1/30/2014 2:20:00 PM
FieldSampler:
Matrix: Filter

Comments Sampled 10/2/13-1/3/14 (2013 Q4)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
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Field

Actual Volume 129227553 Liters Field 12/30/2013 000

Radionuclides - Filter

Lead 210	2054	pCi/Filter		80.0	OTW01	02/19/2014 1149	SH
Lead 210 Precision (±)	96	pCi/Filter			OTW01	02/19/2014 1149	SH
Lead 210	1.6E-14	µCi/mL		6.2E-16	Calculation	05/19/2014 1221	WN
Lead 210 Precision (±)	7.4E-16	µCi/mL			Calculation	05/19/2014 1221	WN
Radium 226	4.4	pCi/Filter	J	6.00	SM 7500RAB	02/07/2014 1420	SH
Radium 226 Precision (±)	1.2	pCi/Filter	J		SM 7500RAB	02/07/2014 1420	SH
Radium 226	3.4E-17	µCi/mL	J	4.6E-17	Calculation	05/19/2014 1221	WN
Radium 226 Precision (±)	9.3E-18	µCi/mL	J		Calculation	05/19/2014 1221	WN
Thorium 230	1.5	pCi/Filter	J	6.00	ACW10	02/20/2014 828	MB
Thorium-230 Precision (±)	1.2	pCi/Filter	J		ACW10	02/20/2014 828	MB
Thorium 230	1.2E-17	µCi/mL	J	4.6E-17	Calculation	05/19/2014 1221	WN
Thorium 230 Precision (±)	9.3E-18	µCi/mL	J		Calculation	05/19/2014 1221	WN
Uranium	0.853	pCi/Filter	J	6.00	EPA 200.8	02/04/2014 1713	MS
Uranium	6.6E-18	µCi/mL	J	4.6E-17	Calculation	05/19/2014 1221	WN

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager

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Sample Analysis Report

Company: Powertech Uranium USA Inc.
P.O. Box 812
Edgemont, SD 57735

Date Reported 5/19/2014
Report ID S1401353003
(Replaces S1401353002)

ProjectName: Dewey-Burdock Project
Lab ID: S1401353-006
ClientSample ID: AMS-009 Q4
COC: WEB

WorkOrder: S1401353
CollectionDate: 12/30/2013
DateReceived: 1/30/2014 2:20:00 PM
FieldSampler:
Matrix: Filter

Comments Sampled 10/2/13-1/3/14 (2013 Q4)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
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Field

Actual Volume	6412259	Liters			Field	12/30/2013 000
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Radionuclides - Filter

Lead 210	65.3	pCi/Filter		2.00	OTW01	02/19/2014 1149	SH
Lead 210 Precision (±)	5.1	pCi/Filter			OTW01	02/19/2014 1149	SH
Lead 210	1.0E-14	µCi/mL		3.1E-16	Calculation	05/19/2014 1221	WN
Lead 210 Precision (±)	8.0E-16	µCi/mL			Calculation	05/19/2014 1221	WN
Radium 226	0.4	pCi/Filter		0.200	SM 7500RAB	02/07/2014 1420	SH
Radium 226 Precision (±)	0.1	pCi/Filter			SM 7500RAB	02/07/2014 1420	SH
Radium 226	6.2E-17	µCi/mL		3.1E-17	Calculation	05/19/2014 1221	WN
Radium 226 Precision (±)	1.6E-17	µCi/mL			Calculation	05/19/2014 1221	WN
Thorium 230	0.19	pCi/Filter	J	0.200	ACW10	02/21/2014 1239	MB
Thorium-230 Precision (±)	0.2	pCi/Filter	J		ACW10	02/21/2014 1239	MB
Thorium 230	3.0E-17	µCi/mL	J	3.1E-17	Calculation	05/19/2014 1221	WN
Thorium 230 Precision (±)	3.1E-17	µCi/mL	J		Calculation	05/19/2014 1221	WN
Uranium	0.328	pCi/Filter		0.200	EPA 200.8	02/04/2014 1729	MS
Uranium	5.1E-17	µCi/mL		3.1E-17	Calculation	05/19/2014 1221	WN

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager

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Sample Analysis Report

Company: Powertech Uranium USA Inc.
P.O. Box 812
Edgemont, SD 57735

Date Reported 5/19/2014
Report ID S1401353003
(Replaces S1401353002)

ProjectName: Dewey-Burdock Project
Lab ID: S1401353-007
ClientSample ID: AMS-BKG Q4
COC: WEB

WorkOrder: S1401353
CollectionDate: 12/30/2013
DateReceived: 1/30/2014 2:20:00 PM
FieldSampler:
Matrix: Filter

Comments Sampled 10/2/13-1/3/14 (2013 Q4)

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
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Field

Actual Volume 124912971 Liters Field 12/30/2013 000

Radionuclides - Filter

Lead 210	2150	pCi/Filter		80.0	OTW01	02/19/2014 1149	SH
Lead 210 Precision (±)	114	pCi/Filter			OTW01	02/19/2014 1149	SH
Lead 210	1.7E-14	µCi/mL		6.4E-16	Calculation	05/19/2014 1221	WN
Lead 210 Precision (±)	9.1E-16	µCi/mL			Calculation	05/19/2014 1221	WN
Radium 226	4.2	pCi/Filter	J	6.00	SM 7500RAB	02/07/2014 1420	SH
Radium 226 Precision (±)	1.2	pCi/Filter	J		SM 7500RAB	02/07/2014 1420	SH
Radium 226	3.4E-17	µCi/mL	J	4.8E-17	Calculation	05/19/2014 1221	WN
Radium 226 Precision (±)	9.6E-18	µCi/mL	J		Calculation	05/19/2014 1221	WN
Thorium 230	2.6	pCi/Filter	J	6.00	ACW10	02/21/2014 1239	MB
Thorium-230 Precision (±)	1.2	pCi/Filter	J		ACW10	02/21/2014 1239	MB
Thorium 230	2.1E-17	µCi/mL	J	4.8E-17	Calculation	05/19/2014 1221	WN
Thorium 230 Precision (±)	9.6E-18	µCi/mL	J		Calculation	05/19/2014 1221	WN
Uranium	1.13	pCi/Filter	J	6.00	EPA 200.8	02/04/2014 1734	MS
Uranium	9.0E-18	µCi/mL	J	4.8E-17	Calculation	05/19/2014 1221	WN

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager

Page 7 of 7



Inter-Mountain Labs

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

ANALYTICAL QC SUMMARY REPORT**CLIENT:** Powertech Uranium USA Inc.**Date:** 2/26/2014**Work Order:** S1401353**Report ID:** S1401353001**Project:** Dewey-Burdock Project**Uranium, Air Filter Analysis**Sample Type **MBLK** Units: pCi/Filter

Sample ID	RunNo: 104328	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
MBLK	02/04/14 13:17	Uranium	ND	0.2					

Sample Type **LCS** Units: pCi/Filter

Sample ID	RunNo: 104328	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS	02/04/14 13:12	Uranium	66.4	0.2	67.7		98.1	85 - 115	

Sample Type **MS** Units: pCi/Filter

Sample ID	RunNo: 104328	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
S1401353-001AS	02/04/14 16:46	Uranium	8680	0.2	8120	0.9	107	70 - 130	

Sample Type **MSD** Units: pCi/Filter

Sample ID	RunNo: 104328	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
S1401353-001AMSD	02/04/14 16:51	Uranium	8890	0.2	8620	2.33	109	20	

Sample Type **DUP** Units: pCi/Filter

Sample ID	RunNo: 104328	Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual
S1401353-001AD	02/04/14 16:41	Uranium	0.8	0.2	0.9	9.44		20	

Lead 210 in FiltersSample Type **MBLK** Units: pCi/Filter

Sample ID	RunNo: 104692	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
MB14-035	02/18/14 17:52	Lead 210	ND	2					

Sample Type **LCS** Units: pCi/Filter

Sample ID	RunNo: 104692	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS14-035	02/18/14 17:52	Lead 210	10	2	12		82.4	70 - 130	

Sample Type **MS** Units: pCi/Filter

Sample ID	RunNo: 104692	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
TAP WATERMS	02/18/14 17:52	Lead 210	14	2	12.3	2	94.9	70 - 130	

Sample Type **MSD** Units: pCi/Filter

Sample ID	RunNo: 104692	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
TAP WATERMSD	02/18/14 17:52	Lead 210	15	2	1243	8.98	105	30	

Qualifiers:

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- L Analyzed by a contract laboratory
- O Outside the Range of Dilutions
- S Spike Recovery outside accepted recovery limits

- E Value above quantitation range
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

**ANALYTICAL QC SUMMARY REPORT****CLIENT:** Powertech Uranium USA Inc.**Date:** 2/26/2014**Work Order:** S1401353**Report ID:** S1401353001**Project:** Dewey-Burdock Project**Radium 226 Air Filter Analysis**Sample Type **MBLK** Units: pCi/Filter

Sample ID	RunNo: 104540	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
MB14-037	02/07/14 14:20	Radium 226	ND	0.3					

Sample Type **LCS** Units: pCi/Filter

Sample ID	RunNo: 104540	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS14-037	02/07/14 14:20	Radium 226	4.6	0.3	5.02		90.8	70 - 130	

Sample Type **MS** Units: pCi/Filter

Sample ID	RunNo: 104540	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
TAP WATER MS	02/07/14 14:20	Radium 226	5.0	0.3	5.02	ND	100	70 - 130	

Sample Type **MSD** Units: pCi/Filter

Sample ID	RunNo: 104540	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
TAP WATER MSD	02/07/14 14:20	Radium 226	5.2	0.3	5.0	3.07	103	30	

Thorium Air Filter AnalysisSample Type **MBLK** Units: pCi/Filter

Sample ID	RunNo: 104743	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
MB14-048	02/20/14 8:28	Thorium-230	ND	0.2					

Sample Type **LCS** Units: pCi/Filter

Sample ID	RunNo: 104743	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS14-048	02/20/14 8:28	Thorium-230	12.1	0.2	12.5		96.5	70 - 130	

Sample Type **LCSD** Units: pCi/Filter

Sample ID	RunNo: 104743	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
LCS14-048 DUP	02/20/14 8:28	Thorium-230	12.8	0.2	12.1	6.43	103	30	

Qualifiers:

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- L Analyzed by a contract laboratory
- O Outside the Range of Dilutions
- S Spike Recovery outside accepted recovery limits

- E Value above quantitation range
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

Appendix E

Landauer, Inc. Reports for Track Etch Radon Detectors

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Radon Monitoring Report

ENVIRON RESTORATION GRP
ATTN: KEN BAKER
8809 WASHINGTON NE
SUITE 100
ALBUQUERQUE, NM 87113

LANDAUER

Landauer, Inc. 2 Science Road Glenwood, Illinois 60425-1586
Telephone: (800) 528-8327 Facsimile: (708) 755-7048

Acct. No. 0410058

PROGRAM NAME: DEWEY BURDOCK

Detector Number	Detector Type	Starting Date	Ending Date	Field Data / Comments	Exposure pCi/l-days	Avg. Radon Conc. pCi/l	AREA GROSS COUNT (SQ MM)	COUNTED BACK GRND	LOT NO.
4855940	DRNF	05-DEC-12	10-JAN-13	AMS-08 CALIB FACT= 34.4 STD DEV= 4.4 DAYS EXPOSED: 35	199.9 18.9	5.6 10.25	508 63.8 A	2.14	101201-011
4855941	DRNF	05-DEC-12	10-JAN-13	AMS-BKG CALIB FACT= 34.3 STD DEV= 3.8 DAYS EXPOSED: 36	303.9 111.5	8.4 10.32	699 63.8 A	2.14	101201-011
4855942	DRNF	05-DEC-12	10-JAN-13	AMS-BKG DUP CALIB FACT= 34.4 STD DEV= 4.1 DAYS EXPOSED: 35	240.1 110.0	6.7 10.28	582 63.8 A	2.14	101201-011
4855943	DRNF	05-DEC-12	10-JAN-13	AMS-09 CALIB FACT= 34.4 STD DEV= 4.1 DAYS EXPOSED: 36	246.1 110.1	6.8 10.28	593 63.8 A	2.14	101201-011

Note: Lower limit of detection 6.0 pCi/l-days.

Radon Monitoring Report

POWER TECH USA
310 - 2ND AVE
PO BOX 812
EDGEMONT, SD 58735

LANDAUER

Landauer, Inc. 2 Science Road Glenwood, Illinois 60425-1586
Telephone: (800) 528-8327 Facsimile: (708) 753-7043

Acct. No. 0410633

PROGRAM NAME: DEWCY-BURDOCK

Detector Number	Detector Type	Starting Date	Ending Date	Field Data / Comments	Exposure pCi/l-days	Avg. Radon Conc. pCi/l	
4855779	DRNF	10-JAN-13	28-MAR-13	* - LESS THAN INDICATED VALUE AMS-BKG BACKGROUND	* 30.0	* 0.4 ±0.04	
4855780	DRNF	10-JAN-13	28-MAR-13	* - LESS THAN INDICATED VALUE AMS-BKG DUP	* 30.0	* 0.4 ±0.04	
4855794	DRNF	10-JAN-13	28-MAR-13	* - LESS THAN INDICATED VALUE AMS-08 ENGLEBERTS	* 30.0	* 0.4 ±0.05	
4855795	DRNF	10-JAN-13	28-MAR-13	* - LESS THAN INDICATED VALUE AMS-09 SOLAR	* 30.0	* 0.4 ±0.04	
Note: Lower limit of detection 30.0 pCi/l-days.							

Radon Monitoring Report

POWER TECH USA
310 - 2ND AVE
PO BOX 812
EDGEMONT, SD 55735

LANDAUER

Landauer, Inc. 2 Science Road Glenwood, Illinois 60425-1586
Telephone: (800) 528-8327 Facsimile: (708) 755-7048

Acct. No. 0410633

PROGRAM NAME: DEWEY-BURDOCK

Detector Number	Detector Type	Starting Date	Ending Date	Field Data / Comments	Exposure pCi/l-days	Avg. Radon Conc. pCi/l	
4897789	DRNF	28-MAR-13	28-JUN-13	AMS-08 ENGLEBERTS	129.7 17.3	1.4 10.08	
4897790	DRNF	28-MAR-13	28-JUN-13	AMS-09 SOLAR	184.1 19.1	2.0 10.10	
4897791	DRNF	28-MAR-13	28-JUN-13	AMS-BKG BACKGROUND	195.5 19.4	2.1 10.10	
4897792	DRNF	28-MAR-13	28-JUN-13	AMS-BKG DUP	189.8 19.3	2.1 10.10	
<div>Initiator: _____</div> <div>Approved: _____</div> <div>Dates: _____</div> <div>Codes: _____</div> <div>Note: Lower limit of detection 6.0 pCi/l-days.</div>							

Radon Monitoring Report

POWER TECH USA
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PO BOX 812
EDGEMONT, SD 55735

LANDAUER

Landauer, Inc. 2 Science Road Glenwood, Illinois 60425-1586
Telephone: (800) 528-8327 Facsimile: (708) 755-7048

Acct. No. 0410633

Detector Number	Detector Type	Starting Date	Ending Date	Field Data / Comments	Exposure pCi/l-days	Avg. Radon Conc. pCi/l	
4911180	DRNF	28-JUN-13	02-OCT-13	AMS-08	39.1 ±4.43	0.6 ±0.05	
4911181	DRNF	28-JUN-13	02-OCT-13	AMS-09	114.7 ±6.8	1.2 ±0.07	
4911182	DRNF	28-JUN-13	02-OCT-13	AMS-BKG	165.1 ±8.5	1.7 ±0.09	
4911183	DRNF	28-JUN-13	02-OCT-13	AMS-BKG DUP	157.7 ±8.3	1.6 ±0.09	
Note: Lower limit of detection 6.0 pCi/l-days.							

Radon Monitoring Report

POWER TECH USA
310 - 2ND AVE
PO BOX 812
EDGEMONT, SD 55735

LICENSES: 101146AL, 1005B4RT

LANDAUER

Landauer, Inc. 2 Science Road Glenwood, Illinois 60425-1586
Telephone: (800) 528-8327 Facsimile: (708) 755-7048

Acct. No. 0410633

PROGRAM NAME: DEWEY-BURDOCK

RECEIVED FEB 10 2013

Detector Number	Detector Type	Starting Date	Ending Date	Field Data / Comments	Exposure pCi/l-days	Avg. Radon Conc. pCi/l	
4894509	DRNF	02-OCT-13	03-JAN-14	* - LESS THAN INDICATED VALUE AMS-08 ENGLEBERT/FINES	* 6.0	* 0.06 ±0.01	
4894510	DRNF	02-OCT-13	03-JAN-14	AMS-09 SOLAR	74.0 ±4.73	0.8 ±0.05	
4894513	DRNF	02-OCT-13	03-JAN-14	AMS-BKG BACKGROUND	63.9 ±4.24	0.7 ±0.05	
4894514	DRNF	02-OCT-13	03-JAN-14	AMS-BKG DUP	65.6 ±4.32	0.7 ±0.05	
Note: Lower limit of detection 6.0 pCi/l-days.							

RESULTS RELATED ONLY TO MONITORS
AS RECEIVED BY LANDAUER.

O.C. Release	Process No.	Report Date	Date Received
LMR	A22863	18-JAN-14	10-JAN-14

PAGE 1 OF 1

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Appendix F

Landauer, Inc. Reports for Thermoluminescent Dosimeters

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Index of TLDs Sorted by Location and Monitoring Date

Sample Location	Monitoring Begin	Monitoring End	Days Monitored	Shipped to Site	Received at Landauer	Days Out	Landauer Serial Number
AMS-08	12/5/2012	1/10/2013	36	11/20/2012	1/28/2013	69	EX00019704U
AMS-09	12/5/2012	1/10/2013	36	11/20/2012	1/28/2013	69	EX000005726
AMS-BKG	12/5/2012	1/10/2013	36	11/20/2012	1/28/2013	69	EX00053295R
AMS-BKG Dup	12/5/2012	1/10/2013	36	11/20/2012	1/28/2013	69	EX00022497Q
AMS-08	1/10/2013	3/28/2013	77	12/15/2012	4/5/2013	111	EX00012636W
AMS-09	1/10/2013	3/28/2013	77	12/15/2012	4/5/2013	111	EX00013866O
AMS-BKG	1/10/2013	3/28/2013	77	12/15/2012	4/5/2013	111	EX00022884P
AMS-BKG Dup	1/10/2013	3/28/2013	77	12/15/2012	4/5/2013	111	EX000124336
AMS-08	3/28/2013	6/28/2013	92	3/12/2013	8/28/2013	169	EX000165124
AMS-09	3/28/2013	6/28/2013	92	3/12/2013	8/28/2013	169	EX000156313
AMS-BKG	3/28/2013	6/28/2013	92	3/12/2013	8/28/2013	169	EX00022407Z
AMS-BKG Dup	3/28/2013	6/28/2013	92	3/12/2013	8/28/2013	169	EX00051690V
AMS-08	6/28/2013	10/9/2013	103	6/9/2013	10/15/2013	128	EX00062488H
AMS-09	6/28/2013	10/9/2013	103	6/9/2013	10/15/2013	128	EX00062611Y
AMS-BKG	6/28/2013	10/9/2013	103	6/9/2013	10/15/2013	128	EX00058704N
AMS-BKG Dup	6/28/2013	10/9/2013	103	6/9/2013	10/15/2013	128	EX00064249L
AMS-08	10/9/2013	1/3/2014	86	10/2/2013	1/11/2014	101	EX00069075P
AMS-09	10/9/2013	1/3/2014	86	10/2/2013	1/11/2014	101	EX00068943F
AMS-BKG	10/9/2013	1/3/2014	86	10/2/2013	1/11/2014	101	EX00068981F
AMS-BKG Dup	10/9/2013	1/3/2014	86	10/2/2013	1/11/2014	101	EX000689493

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ENVIROMENTAL
RESTORATION GROUP
SUITE 150
8809 WASHINGTON ST NE
ALBUQUERQUE, NM 87113

Report Date (YYYY-MM-DD)	2013-01-30
Page	1 of 1
Dosimeter Received	2013-01-28
QC Release	LCA
Analytical Work Order	1302511954

LANDAUER®
Landauer, Inc., 2 Science Road
Glenwood, Illinois 60425-1586
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Telephone: (708) 755-7000
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Customer Service: (800) 323-8830
Technical: (800) 438-3241

Environmental Dosimetry Report

Account : 291406 Subaccount : 1418163 Series: DEW

Location ID Number	Dosimeter Type	Identifier (Client Supplied)	Exposure (Ambient Dose mrem)		Net Cumulative Totals (mrem)			Inception Date (YYYY-MM)	Serial Number
			Gross	Net	Quarter to Date	Year to Date	Permanent		
Monitoring Period:			2012-10-01 to	2012-12-31	Q4	2012			
00000	V03NH	Deploy Control						2012-10	EX00001141I
	V03NH	Control Dose Used	18.8						
00109	V03NH		23.0	4.2	4.2	4.2	4.2	2012-10	EX00053295R
00110	V03NH		21.1	2.3	2.3	2.3	2.3	2012-10	EX00022497Q
00111	V03NH		19.2	0.4	0.4	0.4	0.4	2012-10	EX00019704U
00112	V03NH		23.3	4.5	4.5	4.5	4.5	2012-10	EX000005726

General Information

The Environmental dosimeter is for both indoor and outdoor use, and is designed to withstand extremes of temperature, humidity, precipitation, and other environmental conditions. InLight dosimeters are built on an assembly of a case component with copper and plastic filters along with a four-positioned aluminum oxide detector slide component. Both the case and slide are uniquely bar coded with serial numbers for chain of custody and sensitivity identification. The InLight dosimeter is sealed within a heavy-duty vinyl tamper resistant pouch that has multiple slots to permit several methods of attachment for easy deployment.

Technical Specifications

- Fully meets ANSI N545-1977, NRC Regulatory Guide 4.13, and HPS Draft Standard N13.29 for environmental dosimetry.
- Minimum Detectable Dose - nominally 0.1 mrem (1 μ Sv), reporting to tenths of a millirem ambient dose equivalent.
- Detection Capabilities:
 - Photons (x and gamma rays) with energies above 15 keV nominally: 0.1 mrem to 1000 rem (1 μ Sv to 10 Sv).

Beta particles with energies greater than approximately 500 keV average energy: 20 mrem to 1000 rem (200 μ Sv to 10 Sv).

Control Dosimeter

A minimum of two control dosimeters are provided per shipment. The first is for field deployment/retrieval used to measure exposure during shipment and placement/collection. The second is for transit used to measure exposure during shipment only. Both control dosimeters assigned to a shipment should accompany that shipment both from and to Landauer. Do not use the control dosimeters for any other purpose. Store dosimeters away from radiation when not in use along with the control dosimeter(s) of the same use date.

Dosimetry reports show gross and net dosage. Gross dosage includes the dosage to the controls. Landauer's background subtraction protocol is:

- Subtract the deployment/retrieval control; or if not returned to Landauer
- Subtract the transit control.

Dosimetry Report Information

Location ID Number

Unique number assigned by Landauer.

Dosimeter Type

Dosimeter Type	Analytical Sensitivity	Minimum Detectable Dose Level (mrem)
V03NH	High	0.1
V03NN	Standard	5.0
V06NH	High	0.1
V06NN	Standard	5.0

Identifier

Location name supplied by customer.

Exposure Ambient Dose (mrem)

Gross: Gross exposure before control subtraction.

Net: Net exposure after control subtraction.

Net Cumulative Totals (mrem)

Quarter to Date, Year to Date, and Permanent are accumulated net ambient exposure.

Inception Date

The date Landauer began keeping dosimeter records for a given dosimeter for a monitoring location on the current account.

Serial Number

Dosimeter serial number.

U.S. Patents

6,316,782; 6,127,685; 5,892,234

Landauer, Inc.
2 Science Road
Glenwood, Illinois 60425-1586
www.landauer.com
Telephone: (708) 755-7000
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Customer Service: (800) 323-8830
Technical: (800) 438-3241

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ENVIROMENTAL
RESTORATION GROUP
SUITE 150
8809 WASHINGTON ST NE
ALBUQUERQUE, NM 87113

Report Date (YYYY-MM-DD)	2013-04-11
Page	1 of 1
Dosimeter Received	2013-04-05
QC Release	LCA
Analytical Work Order	1309410992

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Technical: (800) 438-3241

Environmental Dosimetry Report

Account : 291406 Subaccount : 1418163 Series: DEW

Location ID Number	Dosimeter Type	Identifier (Client Supplied)	Exposure (Ambient Dose mrem)		Net Cumulative Totals (mrem)			Inception Date (YYYY-MM)	Serial Number
			Gross	Net	Quarter to Date	Year to Date	Permanent		
Monitoring Period:			2013-01-01 to	2013-03-31	Q1	2013			
00000	V03NH	Deploy Control						2012-10	EX000239002
	V03NH	Control Dose Used	32.7						
00109	V03NH		30.5	-2.2	-2.2	-2.2	2.0	2012-10	EX00012636W
00110	V03NH		36.9	4.2	4.2	4.2	6.5	2012-10	EX00013866O
00111	V03NH		34.6	2.0	2.0	2.0	2.4	2012-10	EX00022884P
00112	V03NH		31.8	-0.9	-0.9	-0.9	3.7	2012-10	EX000124336

General Information

The Environmental dosimeter is for both indoor and outdoor use, and is designed to withstand extremes of temperature, humidity, precipitation, and other environmental conditions. InLight dosimeters are built on an assembly of a case component with copper and plastic filters along with a four-positioned aluminum oxide detector slide component. Both the case and slide are uniquely bar coded with serial numbers for chain of custody and sensitivity identification. The InLight dosimeter is sealed within a heavy-duty vinyl tamper resistant pouch that has multiple slots to permit several methods of attachment for easy deployment.

Technical Specifications

- Fully meets ANSI N545-1977, NRC Regulatory Guide 4.13, and HPS Draft Standard N13.29 for environmental dosimetry.
- Minimum Detectable Dose - nominally 0.1 mrem (1 μ Sv), reporting to tenths of a millirem ambient dose equivalent.
- Detection Capabilities:
 - Photons (x and gamma rays) with energies above 15 keV nominally: 0.1 mrem to 1000 rem (1 μ Sv to 10 Sv).

Beta particles with energies greater than approximately 500 keV average energy: 20 mrem to 1000 rem (200 μ Sv to 10 Sv).

Control Dosimeter

A minimum of two control dosimeters are provided per shipment. The first is for field deployment/retrieval used to measure exposure during shipment and placement/collection. The second is for transit used to measure exposure during shipment only. Both control dosimeters assigned to a shipment should accompany that shipment both from and to Landauer. Do not use the control dosimeters for any other purpose. Store dosimeters away from radiation when not in use along with the control dosimeter(s) of the same use date.

Dosimetry reports show gross and net dosage. Gross dosage includes the dosage to the controls. Landauer's background subtraction protocol is:

1. Subtract the deployment/retrieval control; or if not returned to Landauer
2. Subtract the transit control.

Dosimetry Report Information

Location ID Number

Unique number assigned by Landauer.

Dosimeter Type

Dosimeter Type	Analytical Sensitivity	Minimum Detectable Dose Level (mrem)
V03NH	High	0.1
V03NN	Standard	5.0
V06NH	High	0.1
V06NN	Standard	5.0

Identifier

Location name supplied by customer.

Exposure Ambient Dose (mrem)

Gross: Gross exposure before control subtraction.

Net: Net exposure after control subtraction.

Net Cumulative Totals (mrem)

Quarter to Date, Year to Date, and Permanent are accumulated net ambient exposure.

Inception Date

The date Landauer began keeping dosimeter records for a given dosimeter for a monitoring location on the current account.

Serial Number

Dosimeter serial number.

U.S. Patents

6,316,782; 6,127,685; 5,892,234

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ENVIROMENTAL
RESTORATION GROUP
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8809 WASHINGTON ST NE
ALBUQUERQUE, NM 87113

Report Date (YYYY-MM-DD)	2013-08-28
Page	1 of 1
Dosimeter Received	2013-08-28
QC Release	LCA
Analytical Work Order	1323511313

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Customer Service: (800) 323-8830
Technical: (800) 438-3241

Environmental Dosimetry Report

Account : 291406 Subaccount : 1418163 Series: DEW

Location ID Number	Dosimeter Type	Identifier (Client Supplied)	Exposure (Ambient Dose mrem)		Net Cumulative Totals (mrem)			Inception Date (YYYY-MM)	Serial Number
			Gross	Net	Quarter to Date	Year to Date	Permanent		
Monitoring Period:			2013-04-01 to	2013-06-30	Q2	2013			
00000	V03NH	Deploy Control						2012-10	EX00057712R
	V03NH	Control Dose Used	49.1						
00109	V03NH		51.2	2.1	2.1	-0.1	4.1	2012-10	EX000156313
00110	V03NH		44.1	-5.0	-5.0	-0.8	1.5	2012-10	EX000165124
00111	V03NH		51.1	2.0	2.0	4.0	4.4	2012-10	EX00022407Z
00112	V03NH		49.7	0.5	0.5	-0.3	4.2	2012-10	EX00051690V

General Information

The Environmental dosimeter is for both indoor and outdoor use, and is designed to withstand extremes of temperature, humidity, precipitation, and other environmental conditions. InLight dosimeters are built on an assembly of a case component with copper and plastic filters along with a four-positioned aluminum oxide detector slide component. Both the case and slide are uniquely bar coded with serial numbers for chain of custody and sensitivity identification. The InLight dosimeter is sealed within a heavy-duty vinyl tamper resistant pouch that has multiple slots to permit several methods of attachment for easy deployment.

Technical Specifications

- Fully meets ANSI N545-1977, NRC Regulatory Guide 4.13, and HPS Draft Standard N13.29 for environmental dosimetry.
- Minimum Detectable Dose - nominally 0.1 mrem (1 μ Sv), reporting to tenths of a millirem ambient dose equivalent.
- Detection Capabilities:
 - Photons (x and gamma rays) with energies above 15 keV nominally: 0.1 mrem to 1000 rem (1 μ Sv to 10 Sv).

Beta particles with energies greater than approximately 500 keV average energy: 20 mrem to 1000 rem (200 μ Sv to 10 Sv).

Control Dosimeter

A minimum of two control dosimeters are provided per shipment. The first is for field deployment/retrieval used to measure exposure during shipment and placement/collection. The second is for transit used to measure exposure during shipment only. Both control dosimeters assigned to a shipment should accompany that shipment both from and to Landauer. Do not use the control dosimeters for any other purpose. Store dosimeters away from radiation when not in use along with the control dosimeter(s) of the same use date.

Dosimetry reports show gross and net dosage. Gross dosage includes the dosage to the controls. Landauer's background subtraction protocol is:

- Subtract the deployment/retrieval control; or if not returned to Landauer
- Subtract the transit control.

Dosimetry Report Information

Location ID Number

Unique number assigned by Landauer.

Dosimeter Type

Dosimeter Type	Analytical Sensitivity	Minimum Detectable Dose Level (mrem)
V03NH	High	0.1
V03NN	Standard	5.0
V06NH	High	0.1
V06NN	Standard	5.0

Identifier

Location name supplied by customer.

Exposure Ambient Dose (mrem)

Gross: Gross exposure before control subtraction.

Net: Net exposure after control subtraction.

Net Cumulative Totals (mrem)

Quarter to Date, Year to Date, and Permanent are accumulated net ambient exposure.

Inception Date

The date Landauer began keeping dosimeter records for a given dosimeter for a monitoring location on the current account.

Serial Number

Dosimeter serial number.

U.S. Patents

6,316,782; 6,127,685; 5,892,234

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ENVIROMENTAL
RESTORATION GROUP
SUITE 150
8809 WASHINGTON ST NE
ALBUQUERQUE, NM 87113

Report Date (YYYY-MM-DD)	2013-10-17
Page	1 of 1
Dosimeter Received	2013-10-15
QC Release	LCA
Analytical Work Order	1328412087

LANDAUER®
Landauer, Inc., 2 Science Road
Glenwood, Illinois 60425-1586
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Facsimile: (708) 755-7016
Customer Service: (800) 323-8830
Technical: (800) 438-3241

Environmental Dosimetry Report

Account : 291406 Subaccount : 1418163 Series: DEW

Location ID Number	Dosimeter Type	Identifier (Client Supplied)	Exposure (Ambient Dose mrem)		Net Cumulative Totals (mrem)			Inception Date (YYYY-MM)	Serial Number
			Gross	Net	Quarter to Date	Year to Date	Permanent		
Monitoring Period:			2013-07-01 to	2013-09-30	Q3	2013			
00000	V03NH	Deploy Control						2012-10	EX00058791K
	V03NH	Control Dose Used	38.9						
00109	V03NH		28.6	-10.3	-10.3	-10.4	-6.2	2012-10	EX00062488H
00110	V03NH		41.4	2.5	2.5	1.7	4.0	2012-10	EX00062611Y
00111	V03NH		41.0	2.1	2.1	6.1	6.5	2012-10	EX00058704N
00112	V03NH		34.6	-4.3	-4.3	-4.6	-0.1	2012-10	EX00064249L

General Information

The Environmental dosimeter is for both indoor and outdoor use, and is designed to withstand extremes of temperature, humidity, precipitation, and other environmental conditions. InLight dosimeters are built on an assembly of a case component with copper and plastic filters along with a four-positioned aluminum oxide detector slide component. Both the case and slide are uniquely bar coded with serial numbers for chain of custody and sensitivity identification. The InLight dosimeter is sealed within a heavy-duty vinyl tamper resistant pouch that has multiple slots to permit several methods of attachment for easy deployment.

Technical Specifications

- Fully meets ANSI N545-1977, NRC Regulatory Guide 4.13, and HPS Draft Standard N13.29 for environmental dosimetry.
- Minimum Detectable Dose - nominally 0.1 mrem (1 μ Sv), reporting to tenths of a millirem ambient dose equivalent.
- Detection Capabilities:
 - Photons (x and gamma rays) with energies above 15 keV nominally: 0.1 mrem to 1000 rem (1 μ Sv to 10 Sv).

Beta particles with energies greater than approximately 500 keV average energy: 20 mrem to 1000 rem (200 μ Sv to 10 Sv).

Control Dosimeter

A minimum of two control dosimeters are provided per shipment. The first is for field deployment/retrieval used to measure exposure during shipment and placement/collection. The second is for transit used to measure exposure during shipment only. Both control dosimeters assigned to a shipment should accompany that shipment both from and to Landauer. Do not use the control dosimeters for any other purpose. Store dosimeters away from radiation when not in use along with the control dosimeter(s) of the same use date.

Dosimetry reports show gross and net dosage. Gross dosage includes the dosage to the controls. Landauer's background subtraction protocol is:

- Subtract the deployment/retrieval control; or if not returned to Landauer
- Subtract the transit control.

Dosimetry Report Information

Location ID Number

Unique number assigned by Landauer.

Dosimeter Type

Dosimeter Type	Analytical Sensitivity	Minimum Detectable Dose Level (mrem)
V03NH	High	0.1
V03NN	Standard	5.0
V06NH	High	0.1
V06NN	Standard	5.0

Identifier

Location name supplied by customer.

Exposure Ambient Dose (mrem)

Gross: Gross exposure before control subtraction.

Net: Net exposure after control subtraction.

Net Cumulative Totals (mrem)

Quarter to Date, Year to Date, and Permanent are accumulated net ambient exposure.

Inception Date

The date Landauer began keeping dosimeter records for a given dosimeter for a monitoring location on the current account.

Serial Number

Dosimeter serial number.

U.S. Patents

6,316,782; 6,127,685; 5,892,234

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ENVIROMENTAL
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SUITE 150
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Report Date (YYYY-MM-DD)	2014-01-17
Page	1 of 1
Dosimeter Received	2014-01-11
QC Release	LCA
Analytical Work Order	1401011686

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Location ID Number	Dosimeter Type	Identifier (Client Supplied)	Exposure (Ambient Dose mrem)		Net Cumulative Totals (mrem)			Inception Date (YYYY-MM)	Serial Number
			Gross	Net	Quarter to Date	Year to Date	Permanent		
Monitoring Period:			2013-10-01 to	2013-12-31	Q4	2013			
00000	V03NH	Deploy Control						2012-10	EX000689790
	V03NH	Control Dose Used	29.9						
00109	V03NH		26.4	-3.5	-3.5	-13.9	-9.7	2012-10	EX00069075P
00110	V03NH		34.5	4.6	4.6	6.2	8.6	2012-10	EX00068943F
00111	V03NH		38.1	8.2	8.2	14.4	14.7	2012-10	EX00068981F
00112	V03NH		33.0	3.1	3.1	-1.5	3.1	2012-10	EX000689493

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